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# Antiquity

## A Quarterly Review of Archæology

VOL. I NO. 1 MARCH 1927

## Editorial Notes

ANTIQUITY will attempt to summarize and criticize the work of those who are recreating the past. Archaeology is a branch of science which achieves its results by means of excavation, field-work and comparative studies ; it is founded upon the observation and record of facts. Today the accumulated riches of years lie to our hand, and the time is ripe for interpretation and synthesis. We are emerging from the archaic stage, and we are able at last to see single facts in their relation to an organic whole—the history of Man. Simplification supervenes, and the outline of the past becomes intelligible. Here and there attempts are made to summarize a period or interpret a group of facts ; but they seldom reach the general public, and remain buried in obscure publications. ANTIQUITY will publish creative work of this character.

The Editor has secured the willing support of specialists who will contribute popular but authoritative accounts of their own researches. Knowledge thus acquired is alive, for it is derived at first hand from things, not merely compiled from books. Each article will be but a tiny facet of the whole ; for our field is the Earth, our range in time a million years or so, our subject the human race.

We shall keep our readers informed about important discoveries made and books published ; and we shall warn them of mare's nests. Many so-called discoveries are nothing but newspaper "stunts"; many best-sellers are written by quacks. The public is humbugged, but it is nobody's business to expose the fraud. Such books are ignored by the learned world. Reviewers in literary papers are therefore tolerant, if not favourable, for they hear no word of dissent ; there is a demand for stuff like this, and the case goes by default. Every page may contain gross errors and wild guesses which pass unchallenged. The antidote is to create a sound and informed body of opinion, and to make it articulate.

Epoch-making work, however, is being done throughout the world ; and we cannot devote much space merely to destructive criticism. It will be more profitable to appraise the good than to decry the bad. Let us briefly survey the field. In England we are beginning at last to learn something about the Neolithic period. Villages have been discovered near Abingdon and on Windmill Hill (see p. 104). We can even begin to classify the pottery of the period—though twenty years ago not a single type was recognized. We are now, therefore, no longer dependent upon the scanty sherds that may be found in Long Barrows. At the moment interest is centred in this period.

Abroad, by far the most important discoveries are those of Sir John Marshall in India (see p. 113), which rival the classic finds of Rawlinson, Schliemann and Evans. A new civilization is revealed, with writing and all the appurtenances of an advanced culture. In Egypt Dr Reisner has found the Tomb of the mother of Cheops, the builder of the Great Pyramid, which was built between 2900 and 2800 B.C. according to Breasted's chronology. It is intact and unplundered, but has suffered more than Tutankhamen's at the hands of time. Objects of the 3rd and 4th Dynasties are so rare that a find of this kind is of supreme importance, nor could the work of clearance be in better hands than Dr Reisner's. China is at last yielding up the secrets of her past. Palaeolithic and neolithic remains have been found there; Dr Franz will describe these. An American expedition is setting out to explore the Niger bend—a most promising region ; practically nothing is known of its

archaeology. South Africa is rapidly solving her own palaeolithic riddles, which are closely connected with the main problem of man's ancestry. Central Asia may yield sensational evidence of the same kind when the American expedition, so ably organized and led by Dr Roy Chapman Andrews, can take the field again. A determined effort is being made by the British Museum to explore the vast ruins of Lubaantun in British Honduras. Mediterranean lands are attracting less attention than they did twenty years ago. But there will be a revival of interest if Herculaneum and the Hippodrome at Constantinople are really to be excavated. Both may yield masterpieces of classical art. Syria and Palestine are beginning to return a rich harvest to British, French and American excavators. In Babylonia, the excavation of Kish and Ur is proceeding, and the roots of civilization are being uncovered.

Excavation remains the most valuable instrument of discovery we possess. It may be supplemented by field-work and air-photography. The uses of air-photography are only beginning to be properly appreciated, and they are many. Air-photographs reveal lost or unsuspected remains, such as "Woodhenge" and the Stonehenge Avenue; they show the excavator where to dig for walls, ditches, or pit-dwellings; they reduce a tangle of earthworks to order and may prove their relative ages; they are invaluable to the lecturer and writer to illustrate his thesis. In this last respect their uses will be apparent to readers of the present number. We intend to use air-photographs, whenever possible, for the purpose of illustrating articles, and, reversing the process, to select some of the best available photographs for use with explanatory text and diagrams. Amongst the most startling are some taken in Iraq which, for the most part, are unpublished.

We shall not confine ourselves too rigidly within the conventional limits of archaeology. The past often lives on in the present. We cannot see the men who built and defended the hill-top settlements of Wessex; but we can learn much from living people who inhabit similar sites to-day in Algeria. From such, and from traditional accounts of Maori forts we learn, by comparison, to understand the dumb language of prehistoric earthworks. Thus to see the past in the

light of the present is to give it life and substance ; this is the old anthropological method of Tylor and Pitt-Rivers and it has too long been neglected by archaeologists. Some familiarity with the habits and outlook of primitive communities is essential. In fact, your ' savage ' is himself the ideal archaeologist and excavator; for he is familiar with primitive appliances, and can often explain the use of objects which baffle the ' expert.' We have seen such a one answer a question by producing, from his own village, a modern appliance—in this instance a kind of hoe—which was used for the same purpose as, and obviously evolved from, the old one he had dug up.

Never before has so much been known about the past; never has the desire of knowledge been greater. If the world is our playground, it is also our audience. We employ methods of research undreamt of before; we call in the aviator, the photographer, the chemist, the astronomer, the botanist, to assist us. What is to be the end of it all ? What new idea is to emerge from all this vast accumulation of facts and give them coherence ? Has it already emerged ? We shall return to this, the most important subject of all.

The universal interest in the past is perfectly natural. It is the interest in life itself. There was a time when archaeology was voted a dull subject, fit only for dry-as-dusts ; yet it was not the subject that was dull, but its exponents. Those days are over. If proof were needed it might be found in the welcome with which our preliminary appeal has been received in all parts of the world. We shall do our utmost to justify the good wishes of our correspondents ; we have a policy and shall carry it out. We ask only for time to accomplish it. It is barely a year since the idea of founding ANTIQUITY occurred to us, and our contributors are all busy men. But we have made an excellent start and future progress is assured. To those who have made this possible we tender our most hearty thanks.

# PLATE I

1.—WALL ON SAMSON FLATS, TAKEN FROM THE NORTH HILL OF SAMSON
*Ph.* Gibson, St. Mary's, Scilly

2.—PARTIALLY SUBMERGED STONE CIRCLE, ER LANIC, BRITTANY
*Ph.* Dr R. C. C. Clay

*facing p.5*

# Lyonesse

by O. G. S. Crawford.

ONCE upon a time (so tradition says) a region of extreme fertility lay between the Scilly Islands and Cornwall. This land was called Lyonesse ; and where now roll the waters of the Atlantic there once stood prosperous towns and no less than a hundred and forty churches. The rocks called the Seven Stones, seven miles west of Land's End, are said to mark the site of a large city. This country was overwhelmed by the sea, and the sole survivor, one Trevilian, escaped destruction only by mounting a swift horse and fleeing to the mainland.

Such, stripped to the bone, is the famous legend of Lyonesse. Had it any real basis in fact, or is it merely an invention of the " dreamy Celt " ? There are good reasons for believing that the substance of the legend is true, that within prehistoric times there did actually exist land which is now covered by the sea, and that it has been gradually overwhelmed. In one respect only does the modern critic disagree with tradition. He believes that Lyonesse was the Scilly Islands themselves, not a completely vanished region between them and Cornwall ; and that what is now an archipelago of islands was a single large island, surrounded perhaps by a few rocky islets.

The evidence, both archæological and historical, is very strong. It was my good fortune to be staying in St. Mary's last year, at the time of the spring tides. One day I crossed in a boat to the uninhabited island of Samson ; and from the highest point I observed, stretching across the uncovered sandflats between Samson and Tresco, a long straight line of stones. (Plate 1, fig. 1). I had not time to descend and make a closer investigation ; but when thinking the matter over on my return, I regretted it ; for I could think of no natural explanation of the stones. Further, it seemed probable that this was indeed one of those walls described in 1753 by old Borlase.[1] " The flats," he says, " which stretch from one island to another, are plain evidences

[1] The Rev. Mr Wm. Borlase, M.A., F.R.S. ; *Of the Great Alterations which the Islands of Scilly have undergone since the time of the Ancients. Philosophical Trans., Vol. xlviii.* 1753. (*Abridgements. Vol. x*, 1809). The passage quoted in the text is quoted also by Hunt in *Popular Romances*, p. 193.

of a former union subsisting between many now distinct islands. The flats between Trescaw, Brehar and Samson[1] are quite dry at a spring tide, and men easily pass dry-shod from one island to another, over sand-banks (where, on the shifting of the sands, walls and ruins are frequently discovered) on which at full sea, there are 10 and 12 feet of water." The day following next but one after my first visit to Samson was the day of lowest spring tides (16 March 1926) and it seemed a chance not to be missed. Accordingly I chartered the boat again, and accompanied by Mr Alexander Gibson with his camera, landed again on Samson. Our programme was to photograph the line of stones first from the high ground of Samson, then at closer quarters on the sands ; and afterwards to walk across to Tresco and thence to the island of Bryher. Such a " submarine " walk is only possible at low spring tides.

We found, on walking out across the sands, that the line of stones was undoubtedly the remains of a wall of human construction. (Plate II, fig. 1). It consisted of a number of boulders and stones of about the size and shape of a milestone, some of them still standing upright. All round on either side of the wall were scattered the smaller stones which once filled the spaces between the larger uprights. Elsewhere the sands were almost bare. The fact that some of these stones still remained standing proved conclusively that the thing was artificial, but indeed its general appearance left no doubt whatever in our minds with regard to this.

It was one of those thrilling moments which occasionally occur in the life of an archæologist. Here before us was tangible proof that the land had sunk since prehistoric times ; for no one makes walls like this below high water mark. While Mr Gibson was taking photographs, I wandered about on the sands and picked up a few flint flakes (Fig. 1). Most of these were lying on the tide-scoured sand below the ordinary *low* water mark. Their edges, originally sharp, have been smoothed by the action of the sand and water, so that they have the appearance of gravel-rolled flints. They are quite white and the surface is matte. A few are illustrated here.

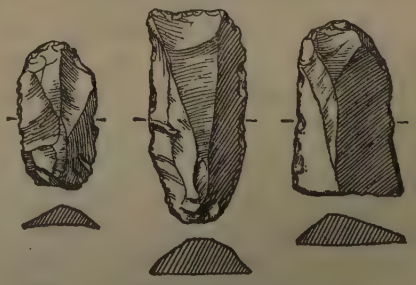

Fig. 1. Flint Flakes picked up on Samson Flats.

[1] Samson Flats falls on sheet 87 NW. of the 6-inch O.S.

1.—THE SUBMERGED BOULDER-HEDGE ON SAMSON FLATS
*Ph.* Gibson, St. Mary's, Scilly

2.—MODERN "HEDGE" OF BOULDERS NEAR WATERMILL, ST. MARY'S, SCILLY
*Ph.* Gibson, St. Mary's, Scilly

*facing p.*6

The wall was about 250 yards long, and ended at a bare, rocky eminence called Black Ledge. On the further (north-eastern) side of this rock, a line of stones was visible, half covered by the sea even at this exceptionally low tide. I waded out to it in the hope of being able to discover whether it was another of these walls ; but the water was over my knees and the tide was on the point of turning, so that I could not satisfy myself on this point.[1] We duly reached Tresco—though neither of us dry-shod !—but the tide was now rising and we were too late by about ten minutes to continue on foot across to Bryher. My reason for wishing to visit that island was that on the 25-inch map there are marked some apparently very perfect examples of prehistoric stone walls. We were not disappointed. We found them on the bleak hill which forms the northern part of the island. They were precisely similar in character to the submerged wall we had just visited.

Such prehistoric walls occur on all the larger islands, and on some of the smaller ones which are not now inhabited. A peculiar feature is that at frequent intervals along them occur small round cairns of stones. I observed these on St Mary's, on Gugh, and on Samson, as well as on Bryher, where the cairns are marked on the 25-inch map. They are said to occur also on similar walls on the moors of Cromar, in Aberdeenshire. The walls themselves are clearly field-walls. Even to-day the field-walls of the Scilly Islands are made in exactly the same way. (Plate II, fig. 2). I happened to see one being built. Large upright stones are set up some few yards apart, and the space between is filled with smaller stones. The materials are obtained, whenever possible, from the area to be enclosed. The task of building these "stone hedges," as they are called, is not so simple as it might appear to be ; considerable skill is required, and no doubt the inherited experience of generations has been handed down by tradition from prehistoric times.

The stone hedges of abandoned fields are to be seen on the moorlands everywhere in Great Britain. They are common in Wales, where, too, the old methods of construction are still employed, There, a wide double row of upright stones is set up, and the space between—often as much as six feet—is gradually filled in with smaller stones picked from the field itself. When the wall is left to fall into ruin, this core of smaller stones spreads out on either side of the

[1] Since writing this, Mr. Alexander Gibson reports that he has been told of similar submerged walls between the west coast of Samson and White Island, and off the west shore of Tresco.

uprights, and they too gradually collapse, till only a few are left standing. In some parts of Wiltshire, where the downs are covered with sarsen stones, these were set up round the prehistoric field. Many such are to be seen in the lynchets of Celtic fields on the Marlborough downs. The Celtic fields on the hills round Bath were enclosed by dry walls, set with a few large bonding uprights (called " grounders " in Cornwall) ; but owing to the flat cleavage of oolitic limestone, the construction was much easier, and the walls consisted, for the most part, of quite small stones, as they do to-day.

An interesting account of the construction of these boulder-hedges in Cornwall is given by Hunt in his fascinating *Popular Romances of the West of England*.[1] Some echo of prehistoric times lingered even in the last century. Tom, the Giant, was a great hedger, when in the mood for work ; " then, if he found any of his neighbours ' hedging,' he would turn to and roll in all the largest rocks from over the fields, for ' grounders.' "

From another legend we learn how Tom came to the castle of another giant. " This place was hedged in with great rocks. . . . they call them the Giant's Hedges to the present day." He was returning from market, fortified by three or four gallons of beer, and in a somewhat truculent mood, it would seem, for he determined to fight the giant. He opened the gate and drove his two oxen and the waggon through. He drove for a mile without seeing anything except the fat cattle of all sorts in the fields. At last he came to a pair of gates in a high wall, which was close to and surrounding the giant's castle. There was no passing round these, as there were deep ditches on either side of these gates. In due course he met the giant and killed him, succeeding to his wife and cattle and all his possessions. Have we not here a faithful description of a typical prehistoric hill-fort surrounded by its fields and pasture grounds ?

But to return to the Scillies. The boulder-hedge on Samson flats is plainly just such a hedge as those I have described. It cannot possibly have been made when the land stood at its present level, for it is completely submerged except at ordinary low tide. The question may be asked—How comes it to have been preserved ? Why has it not been destroyed by the sea waves ? The answer is, I think, supplied by the *Geological Memoir*[2] on the Scilly Isles ; but I must first explain

[1] Third ed., London, 1881, pp. 56, 60.

[2] George Barrow, F.G.S. *The Geology of the Isles of Scilly. Memoirs of the Geological Survey of England and Wales* (on sheets 357 and 360), H.M.S.O., 1906. 1s

that Samson flats lie within the inland sea of Scilly, where the huge Atlantic rollers never come. Erosion, therefore, is less violent here than round the outer shores of the archipelago. The bed of the shallow inland sea is uniformly sandy ; and it is suggested by the author of the *Geological Memoir* that the presence of all this sand needs some explanation. He considers that it was originally formed by the action of wind—that the sand flats are, in fact, submerged sand dunes. It seems therefore probable that the prehistoric walls were buried in sand before submergence ; and that this mantle of sand protected them from destruction by the waves. The tidal scour has now removed the sand, but it has little erosive power against the heavy boulders of which the walls were made.

The history of Samson Flats seems to have been as follows :— originally the whole archipelago stood at a higher level than at present, consisting of one or more large islands with an outer fringe of reefs and islets. The area now occupied by the inland sea was a level plain covered with a thick layer of glacial deposit, resting upon the granite rock and forming a region of relative fertility. This would have been the most " habitable " part of the region, because of the greater depth of soil, and because it was sheltered on all sides by higher ground. Here lived the prehistoric builders of the submerged walls. Here were their huts and the pasture grounds of their flocks and herds, separated by the walls whose remains have so strangely been preserved beneath the sea.

But all the time the Atlantic was steadily pounding the outer islets into sand, and the wind carrying this sand inland from the west, to fall on the lee side of what is now Samson. At last the whole of the inland plain was buried. Then the land sunk—it may have been slowly sinking all the time—and the shores assumed something like their present outline.

But not quite their present outline ; for everywhere to-day, even round the calmer shores of the inland sea, wave-erosion is proceeding. The soft blanket of glacial deposit—a gritty clay or gravel—is being eaten into bays ; sand dunes are forming again ; and the habitable area is being yet further reduced. The smaller islets are rapidly losing their glacial mantle, and with it go the grass and flowers. Even the larger islands will one day be split up into barren reefs by the waves ; for when once glacial soil is gone, the most flowery isle will be as desolate as Mincarlo.

That England stood at a higher level in prehistoric times has, of

course, long been known. Everywhere along the coast may be found remains of submerged forests exposed at low tide. Flint implements have frequently been found among the roots of the trees; and in Essex Mr Hazzledine Warren found a skeleton buried below high water mark. With true insight Mr Warren called this the "Lyonesse" surface, although the facts here brought forward for the first time were then quite unsuspected. Such a forest may still be seen in Mount's Bay, between Penzance and St. Michael's Mount; it is certain that the land stood at a higher level when it flourished here. At low tide flint flakes of human manufacture have been picked up in it; and a piece of wood, humanly fashioned, has been found in Marazion marsh at least 12 feet below mean sea level. Human remains, including human skulls and bronze implements, have been found in the submerged beds of the valleys. All these facts prove subsidence; they have been fully dealt with by the late Mr Clement Reid in his book on *Submerged Forests*.[1]

A similar subsidence has taken place in Brittany, and in the Channel Islands during prehistoric times. In Jersey there is a fine submerged forest in St. Brelade's Bay, and it is even said that prehistoric burial cists or chambers occur below high water mark. Unfortunately the precise archæological period to which these remains belong is still uncertain.

The evidence from Brittany is much clearer. What could be more startling than the half submerged Stone Circle[2] on the island of Er Lanic illustrated on plate 1, fig. 2. Could more sensational evidence of subsidence be found anywhere? Some of the stones are standing upright still after all these years; but some, which had fallen, have been set up again in their original holes.

That the Scilly Islands were once a single large island—or one big one with a few islets or reefs—may therefore be taken as proven; and it may further be said that part at least of this submergence took place within prehistoric times. It was part of the same movement as that which affected the coasts of Cornwall and Brittany. How long it is since the Scilly Islands were split up is a difficult matter to determine. That they were still a single island as late as the third century of the Christian Era is suggested by the fact that Solinus, writing about

[1] Clement Reid, F.R.S. *Submerged Forests. Cambridge Manuals of Science and Literature.* 1913.

[2] A good illustration of the Circle was published in *The Sphere*, 21 August 1926.

COAST-LINE
OF
SCILLY ISLES
as it would be if the land were raised 60 feet above its present level.
ST MARTINS
TRESCO
BRYHER
Tresco and Samson Flats
SAMSON
Crow Bar
ST MARY'S
GUGH
ST AGNES
Bishop Rock
The ten fathom line
Present coast-line of the islands
SCALE
0
1
2 MILES

240 A.D. speaks of them in the singular—Siluram insulam.[1] The only other ancient writer who mentions Scilly by name—Sulpicius Severus, 400 A.D.—also refers to it in the singular. It would be dangerous to rely too much upon this evidence, but it is at any rate not in conflict with the evidence from other sources.

Probably my readers have been hoping to learn the date of the wall or boulder-hedge on Samson Flats. How old is it? Alas, at present it is impossible to say. All that one can say is, that up to the present, there is no evidence that either the Scilly Isles or Cornwall were inhabited at all before the Bronze Age, and that the wall may have been made therefore at any time from the Bronze Age to the beginning of the present era. (It is hardly likely to be later). It may, of course, be older, for, let it be observed, I do not say that Cornwall and the Scilly Isles were uninhabited before the Bronze Age, but that there is no evidence that they were inhabited, and that is a very different thing. The only proof that they were inhabited before the Bronze Age would be the discovery of pottery or other remains which can be proved to belong to an older period; and those remains have yet to be recorded. Stone implements were made and used throughout the Bronze and Iron Ages, and the absence of metal on an excavated site proves nothing. The West of England abounds in prehistoric remains, but it has yet to produce an archæologist of the first rank. The scientific study of these remains has not yet begun, though Lukis and Borlase were both excellent archæologists in their day.

The Legend of Lyonesse may, then, be true; but is it a direct traditional inheritance of the submergence? I think not. It is more likely that it has arisen in later times, through the acute observation of fishermen and other unlettered folk. It is a common mistake to suppose that an "uneducated" person is less intelligent or less accurate in observation than one who has acquired book-knowledge. It would probably be more true to say that he is more intelligent and a better observer, because his mind is clearer. That certainly holds good so far as my limited experience of "primitive" people goes. Provided they are quite unspoilt by book-learning, their observations

[1] His actual description is worth quoting :—"A tempestuous channel separates the island of Silura from the coast occupied by the British tribe of the Dumnonii. Its inhabitants even to-day have primitive customs; they do not recognise money; they give and exchange goods; they obtain the necessaries of life by barter instead of by purchase; they worship gods; and men and women alike claim to foretell the future." *Polyhistor.*, chap. xxiv.

are generally trustworthy and their deductions sound, up to a point. In this instance, it seems to me probable that the legend arose somewhat after this fashion. Fishermen and others observed these walls (they still observe them and have told me of the existence of others that I have not yet been able to go and see). They recognize that they are of human making, and that they could not have been made when the land stood at its present level. They infer, quite correctly, that the land must have sunk. So far the inference is correct, and the process of reasoning could not be improved upon by the most eminent " highbrow." But the science of geology is a closed book to them ; they do not realize the infinite slowness of Nature, and they bring in a cataclysm to account for the submergence. Our ancestors did the same elsewhere, and they were accounted wise men in their day ; but their outlook was arbitrarily confined, and their conclusions therefore were erroneous. It was not —at least it need not have been—a cataclysm which submerged Lyonesse; such a cataclysm, involving a drop of so many feet, would be unique in history. It would have been accompanied by an earthquake that would have shattered every building and monument in Europe. No, it is unnecessary to assume any violent disturbance ; for the ordinary movement of the crust will account quite well for the facts.

Thus, too, it was incorrect to infer—if the real authors of the legend ever did, which I doubt—that any land ever wholly disappeared between Land's End and the Scillies. If the preceding argument is correct, the Seven Stones must once have been a habitable island, now reduced to a bare skeleton by subsidence and the erosion of its glacial covering. But it is unlikely—though perhaps not impossible—that the islands were once connected with the mainland. Inference here passes into the realm of speculation.

We meet with a precisely similar case of folk legend in the heart of England ; and it probably arose from similar observations of fact imaginatively interpreted. In Shropshire are many meres or small lakes. On the shores of some of them there were prehistoric lake-dwellings ; and in one, at Ellesmere, the causeway leading to the settlement (now submerged) has been met with.[1] Of these meres many folk tales are told, recalling times when the site was occupied by a palace, town, or church ; and it is said that the bells of the

[1] *Shropshire Folklore*, edited by Charlotte Sophia Burne, from the Collections of Georgina F. Jackson. London, 1883, p. 77.

church still lie there, and have even been seen and heard. What is this but a fisherman's inference from the observation of a causeway, " old crocks," wooden piles and such like, encountered while fishing ? (It must be remembered that only since the universal use of china for domestic purposes has the villager ceased to recognize potsherds as evidence of occupation ; for the broken pots of 200 years ago were not vastly unlike those of prehistoric times, and he knew what these were when he saw them).

Every ancient site doubtless once had its legend to account for its origin. Some doubtless contain an echo of times past, however faint ; and others may have arisen from crude rationalization. The Legend of Lyonesse undoubtedly contains a vestige of antiquity, though the land may have sunk with infinite slowness, and Trevilian have hastened in vain.

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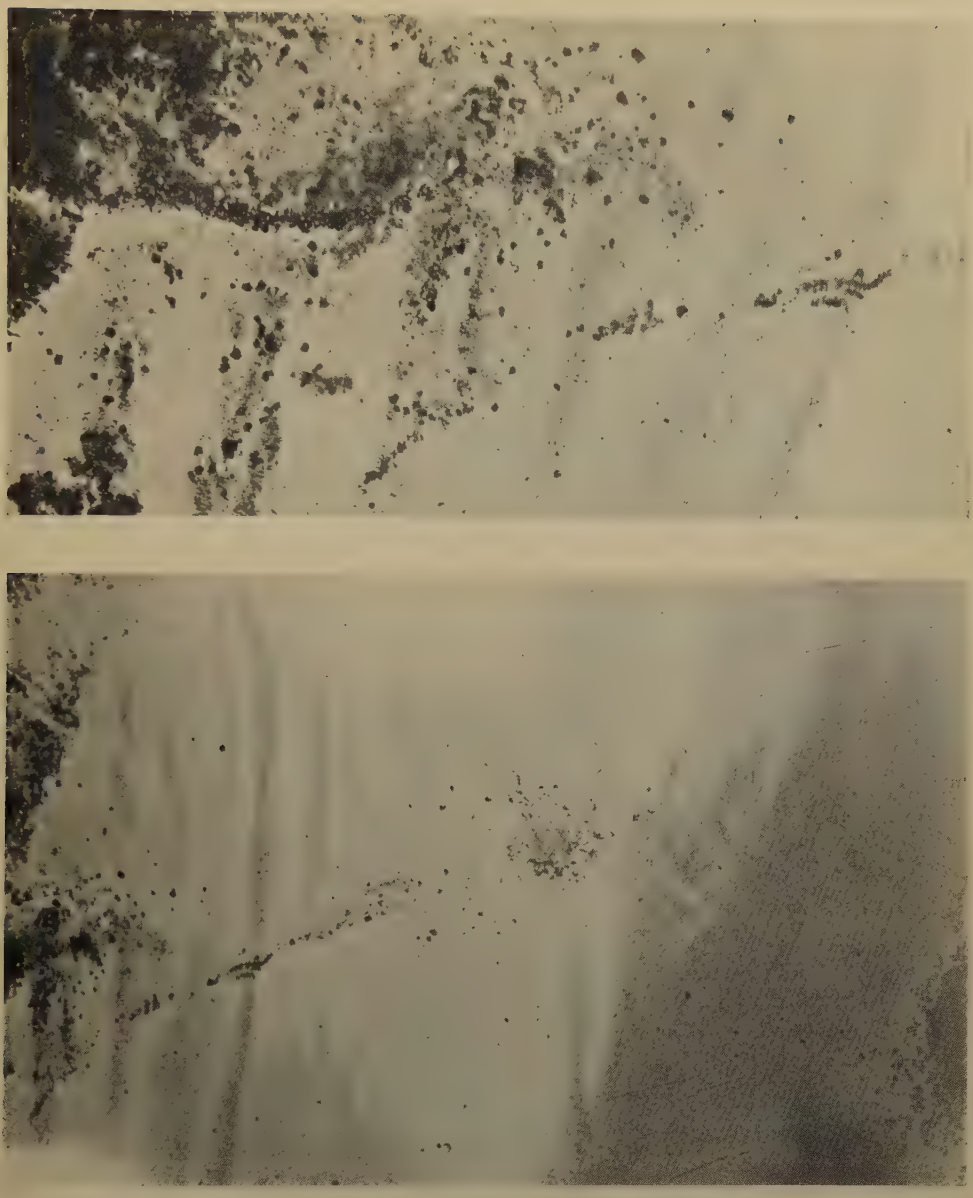
Thanks are due to the officers of No. 10 Group, R.A.F., and No. 480 Flight, Calshot, who are responsible for the taking of the air-photographs reproduced on plate III. These photographs bring out the artificial nature of the wall very clearly, and indicate the existence of short lengths of others with a different alignment. The photographs are reproduced with the permission of H.M. Stationery Office, and their publication has been approved by the Air Ministry.

PLATE III



SUBMERGED WALL ON SAMSON FLATS, TAKEN FROM THE AIR
*Ph.* by 480 FLIGHT, CALSHOT

*Reproduced by permission of H.M. Stationery Office*

*facing p.* 14

# The Roman Frontier in Britain

by R. G. Collingwood, F.S.A.

IT was Augustus who first realized that the Roman Empire could not go on expanding for ever. Horace could write

*Caelo tonantem credidimus Iovem*
*Regnare; praesens Divus habebitur*
*Augustus adiectis Britannis*
*Imperio gravibusque Persis;*[1]

but a very real part of Augustus' claim to grateful veneration lay in the fact that he made up his mind to leave Britons and Parthians alone —to seek in them not new subjects, but peaceful and respectful neighbours. *Coercere intra terminos imperium*[2] was the advice he left to his successors; and in principle they never departed from it. Claudius might conquer Britain, Trajan Mesopotamia and Dacia; but these were "rectifications," as we say nowadays, not obliterations, of the imperial frontier.

For the frontier of the Empire, as Augustus left it, was far from perfect. Tiberius, concerned above all to maintain intact the system created by Augustus, played here, as everywhere, a waiting game, and did not meddle with the Augustan frontiers. But his successor Gaius, or "Caligula," may have contemplated a conquest, or at least an invasion, of Britain; he certainly made a demonstration on the shore of the Channel.[3] And Claudius, the fourth Emperor, took the decisive step. Britain and Gaul were too close together, too intimately linked by geography, blood and civilization, to permit of an unfortified Channel frontier. Southern Britain was already in part Romanized, and the flag followed trade.

The Claudian conquest was well-organized and proceeded at first smoothly. There is some reason to think that, after the first three campaigns, a temporary frontier-line was drawn across the country

[1] *Odes* iii, 5. [2] Tacitus, *Ann.* i, 11. [3] Suetonius, *Gaius*, 46.

diagonally from South Devon through Bath, Cirencester and Leicester to Lincoln ; this line is marked by a road, the so-called Fosse, which is difficult to explain on any other hypothesis, and there is a famous passage of Tacitus which seems actually to describe its construction as a frontier-line.[1] If so, we have here the first Roman frontier in Britain. There is nothing surprising in the fact that it consists simply of a road studded with forts. *Limes*, the Latin for a frontier, means a road long before it means a wall or earthwork. Originally it is anything that "goes across,"[2] and is especially used for the path or balk between two strips of ploughed land. As a military term it signifies a strategic road, driven through enemy country as a means of conquering it ; we find this meaning plainly set forth in Tacitus (e.g. *Ann.* i, 50 ; ii, 7), Frontinus (*Strat.* i, 3) and elsewhere. And one of the earliest Roman conceptions of a frontier was that it should consist merely of such a military road.

After this began a fresh forward movement, into whose vicissitudes we need not here enquire, for its various stages were not, so far as we know, marked by the creation of definite frontier-lines. We can only conjecture that temporary frontiers were from time to time established and cancelled again ; but there is only one to which we can actually point. That is Agricola's line established between the Forth and the Clyde to mark the point reached by him, during his great northward advance, in or about the year 80. Tacitus (*Agricola*, xxiii) tells us of its construction, and its relics have been found in a number of different places, where smallish earthen forts associated with Flavian objects have been found underlying the larger and more solid structures built two generations later by Lollius Urbicus.[3] It seems very clear that this *limes* was soon abandoned ; probably in or about 83, if not earlier ; for Agricola was pushing on, and of the forts which he built while actually conquering the country he seems to have kept only a select few permanently garrisoned. In this case, Camelon appears to have been chosen for this purpose,[4] but the *limes* as such was demolished.

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[1] Tacitus, *Ann.* xii, 31 : *cunctaque cis Trisantonam et Sabrinam fluvios cohibere parat* (accepting Bradley's emendation for *castris antonam*, and assuming Trisantona= Trent). This interpretation of the Fosse was advanced by the writer in the *Journal of Roman Studies*, xiv (1924), where the whole question is discussed.

[2] *Limes*, *limitis :* from *limus=transversus* (cf. *limen* threshold : so Festus) and the root—*it* ' going.' Cf. Fabricius, art. ' Limes ' in Pauly-Wissowa's *Realencyclopädie*.

[3] Haverfield, *Agricola and the Antonine Wall*, *Proc. Soc. Ant. Scot.*, 1917–18, 174–81. Macdonald, *Roman Wall in Scotland*, 382–8.

[4] Macdonald, *op. cit.*, 385–6.

It is curious that on his recall Agricola seems neither to have established a new frontier nor to have re-established this old one. He had by now penetrated into Strathmore, and established himself at least as far north as Inchtuthill, at the confluence of the Tay and the Isla[1]. On his recall, he had not reached any point at which a new frontier could have been drawn. His left flank was menaced by the Perthshire mountains, and no *limes* could be satisfactorily drawn either parallel to the hills or at right angles to them. Curiously enough, his recall was practically coincident in time with Domitian's organization of the frontier in Germany ; but though frontier-organization was in the air, it seems that no steps were taken to construct a frontier in Britain. It used to be thought that Agricola's conquests in the north were abandoned on his recall. Even were that view correct, we should still be unable to say where the evacuation ended, or to point out any *limes* for the period between Agricola and Hadrian. But it is now fairly clear that the assumption of an immediate withdrawal is baseless. At Inchtuthill, at Ardoch, at Camelon, a close criticism of the results reached by excavators some time ago, proves that the Flavian occupation lasted long enough to fall into several distinct periods, each marked by a good deal of rebuilding. At these three sites—and one ought perhaps to add a fourth, Newstead— the evidence for a prolonged occupation after Agricola's recall is definite in character and respectable in bulk.[2] But there is as yet no evidence that any definite frontier was constructed for the next forty years. So far as we know at present, the north of England and the south of Scotland were held during this period by a certain number of forts placed at strategic points—how many, we cannot pretend to guess—and " petering out," rather than brought to a definite edge, in the neighbourhood of Perth.

This implies an unsatisfactory military situation. In Scotland, the Romans held a mere strip, long and narrow, roughly defined by the sinuous line Melrose–Edinburgh–Falkirk–Stirling–Perth. East of this line, everything was perhaps in their hands, but west of it lay the

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[1] Excavations : *Proc. Soc. Ant. Scot.* 1901–2, 182–242, and *Jour. Rom. Stud.* ix. 113–122.

[2] Macdonald, *The Agricolan Occupation of North Britain*, *J.R.S.*, xix, 111–138. Home, *Roman York*, 36–37, seems to express dissent, but makes no attempt to re-interpret the facts in any other way, and bases his case on false assumptions as to the implications of Macdonald's theory. For Newstead, see Richmond in *Proc. Soc. Ant. Scot.* 1923–4, 309–321. While this was in the press I heard of a further and apparently conclusive confirmation in the excavations going on at Mumrills.

wild and almost untouched country of the central and western Lowlands and the southern Highlands, a constant menace to so long and so thin a line. Wales and northern England were completely conquered, but not so completely pacified as to permit a safe removal of all troops ; so that the army of Britain was spread out over a strip of country 350 miles long, whose northernmost point was 200 miles away from the nearest legionary fortress, by a line of communications half of which was dangerously exposed on the flank. It was unsound strategy, and defensible only on the plea that, to Agricola, it represented a temporary phase in the conquest of Scotland ; his unceasing offensive gave the enemy no time to hit back. But when the offensive stopped, the weakness of the situation must have appeared at once. And the rebuildings traced by Sir George Macdonald at the Scottish forts suggest that these were more than once, during this period, successfully assaulted and destroyed. This does not imply the annihilation of their garrisons, which according to Roman practice joined hands every summer with the legions from the three great fortresses—York, Chester, Caerleon—and formed one or more field armies ; during distant operations, a local rising might easily overpower the small body left in charge of the fort and destroy its buildings. Yet the possibility of such risings proves the general insecurity of the position.

For many years, however, the Romans clung tenaciously to what they had gained. There is no conclusive evidence at present for the exact length of this period. It is probable that a good deal of reorganization took place about the turn of the century, and the northernmost Scottish forts may have been abandoned then ; but this is wholly uncertain. What is certain is that one whole legion disappears from the Army List between 107 and 122. The Ninth " Spanish " Legion lay at York, and we have an inscription recording its presence there in the twelfth *tribunicia potestas* of Trajan, A.D. 107.[1] On the other hand, the exceedingly numerous inscriptions connected with the building of Hadrian's Wall do not mention this legion, and we know that about 122 the Sixth " Victorious " legion came over from Germany to take charge of the York fortress.[2] This implies that the Ninth had disappeared by that time. We also know that at the beginning of Hadrian's reign (in or about 117, that is) there was trouble in Britain amounting to a

[1] C.I.L., vii, 241, where the date is given as 108–9 ; but see Cagnat, *Cours d'Epigraphie latine*, p. 194.

[2] For the date see Ritterling in *Pauly-Wissowa*, xii, 1606.

more or less successful revolt,[1] and that, at some time in the same reign, the Roman army in Britain suffered very heavy casualties.[2] Putting these facts together, we may date the annihilation of the Ninth Legion about the beginning of Hadrian's reign.[3] Now it is easy to see how a whole legion might be destroyed when operating in Scotland ; it would merely be another *Variana clades* on a smaller scale. But our authorities do not suggest, neither is it reasonable to assume, that the legion was attacked and overwhelmed in its own stronghold. Hence the probability is that this disaster was directly due to the unsatisfactory strategical situation following Agricola's recall, and that it served to demonstrate unmistakably the need for a new military policy.

This new policy was expressed in Hadrian's Wall. But this great barrier did not issue fully-formed from any single brain. It was the result of numerous experiments and adaptations whose history is exceedingly intricate and is very far, as yet, from being completely known. In order to arrive at some idea of what really happened, it is necessary to review, however briefly, the general state of the frontiers in Hadrian's time and the policy which he was, during these years, pursuing.

It was the special task of Hadrian to re-emphasize the Augustan precept ' keep the Empire within its boundaries,' and to give it, for the first time, a solid basis by drawing boundaries within which the Empire could be kept. Elsewhere, as in Britain, he constructed frontier-works ; but when these are envisaged as a whole it is clear that their purpose was not so much the defence of the Empire against an aggressive barbarism as the clear and scientific delimitation of its extent, resulting on the one hand in the renunciation of further conquests and, on the other, in a cheaper and more secure defence where defence was needed. The point can hardly be put better than it was put by Pelham: "he abandoned a policy of conquest in the conviction that the empire had reached its natural limits, and required not expansion but consolidation. In this belief he set himself to give the Empire, what it had only imperfectly possessed before, definite and well-marked frontiers."[4]

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[1] Spartian, *Hadr.* v, 2.

[2] Fronto, 218 N.

[3] Ritterling, *op. cit.* 1669, argues that certain recorded careers (L. Aemilius Karus, L. Novius Saturninus) suggest a decidedly later date—after 120, and preferably after 125. I cannot think that this is consistent with the legion's absence from the British mural inscriptions.

[4] Pelham, *Essays on Roman History*, 162.

The idea of marking a frontier by means of a continuous ditch was far older than Hadrian ; it goes back to the ditch of Scipio in Africa ; but it seems to have been first revived and applied, with modifications, to the needs of the Empire by Hadrian. Spartian tells us that about 120–122 Hadrian erected massive palisades to separate the barbarians (from the Empire, that is). Of these we have abundant traces on the upper German and Rhaetian frontier. Here, before Hadrian's time, the frontier had been the mere fore-edge of a network of forts, built up by degrees during the Flavian-Trajanic period. But what, exactly, was the significance or purpose of the new palisade ? It is quite certainly not a continuous fortification. Mommsen's observations are conclusive.[1] "Neither the one nor the other [neither the Pfahlgraben nor the Teufelsmauer, which superseded Hadrian's palisade] was constructed for the defence, as a whole, of the frontier. Not merely was the hindrance. . . . to an assailant slight in itself, but along the line we meet everywhere with commanding positions, morasses, lying in the rear, a want of outlook towards the country in front, and similar clear indications of the fact that in the tracing of it warlike purposes generally were not contemplated." What Mommsen here says of the later German works is *a fortiori* true of the earlier ; Hadrian's palisade, considered as a military obstacle, shows all the weaknesses enumerated by him and some others of its own. It can only have served two purposes : to mark unmistakably the point at which Roman territory ended, and to facilitate the patrolling of the line by making it difficult for casual bands of robbers to cross it. For such a palisade, though no obstacle to an army, was a real obstacle to petty thieves and cattle-lifters. You cannot lift cattle over a nine-foot fence. And if evidence is required that the Roman government took petty thieves seriously, it is to hand in the shape of inscriptions set up by Commodus announcing that he had fortified the Danube bank precisely in order to frustrate these persons.[2]

Elsewhere Hadrian's policy was similar. We may instance the Dobruja frontier, where a ditch was dug and an earthen rampart thrown up, probably, by Hadrian ; and the Numidian frontier, where similar works were constructed about the same time. In all these cases, and in others—there is no need to enumerate them exhaustively here[3]—

[1] Mommsen, *Provinces of the Roman Empire*, E.T., i, 157.

[2] C.I.L., iii, 3385 (=Dessau 395) *ripam omnem burgis a solo extructis item praesidis per loca opportuna ad clandestinos latrunculorum transitus oppositis munivit : ibid.* 10312–3.

[3] Fabricius, art. *Limes*, in *Pauly-Wissowa*, xiii.

Hadrian's principle is clear. He first selected the best line for a frontier, and then marked it by means of a continuous work which in certain cases might serve as an obstacle to *latrunculi*, but was never intended as a military defensive work.

Now let us return to Britain. We do not know what exactly was the situation with which Hadrian had to deal ; but it probably included a recent and far-reaching collapse of the unstable system left behind by Agricola, a collapse which, while not involving the loss of York, did involve the loss of the Ninth Legion. If, as Spartian suggests, this disaster took place about 117, some steps must have been taken to stem the tide of defeat before Hadrian's arrival in Britain in 122. And of these steps we have actual relics. There is a road, locally known as the Stanegate, which runs roughly parallel to Hadrian's Wall and a little way south of it. On this road are Roman forts of four different periods : (i) Agricolan, about A.D. 80 ; (ii) late Domitian or early Trajan, about 100[1] ; (iii) late Trajan, about 115 ; (iv) Hadrian, about 120. Period (iv) synchronizes with the building of the Wall ; period (ii) is unmistakably earlier than the Wall, but very little earlier. The forts of this period[2] are only explicable as representing a concentration along the Stanegate line a few years before the building of Hadrian's Wall ; and, proving as they do that the Stanegate became a *limes* about the beginning of Hadrian's reign, they strengthen the evidence for the view that this was the time at which the Ninth Legion was destroyed and the last remnants, if not the whole, of Agricola's northern conquests lost.

The theory of Hadrian's work which held the field till 1925 was as follows. A ditch, more or less of the ordinary Hadrianic type, was dug, and forts were built along it, on a line slightly advanced from the Stanegate. The forts stood on the far side, the enemy's side, of the ditch, doubtless to facilitate operations against the enemy, a fact eloquent of the non-military character of the ditch, the so-called Vallum. Each fort was connected with the Stanegate by a branch road. That was Hadrian's original frontier : whether planned by himself in 122 or by his legates a little earlier does not matter. At a later date, but very little later, the great stone wall was built, complete

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[1] The *separate* existence of this period is not proved. Nether Denton was certainly occupied then, but we do not know that it was then first occupied. *Archaeologia*, lxiv, 303.

[2] Haltwhistle, Burn, and Throp, are the dated examples. For the establishment of their date, see *Cumb. and West. Trans.*, N.S., xiii, 379–381.

with its mile-castles and turrets,[1] linking up the forts directly. The grounds for believing that the Wall was later than the forts and Vallum were various. For one thing, each fort seemed built as a self-contained work, and the Wall abuts against its curved angle as if it had been an afterthought; for another, the ditches of the forts seemed to run underneath the Wall, which had collapsed into them at various places; again, the course followed by the Wall seems here and there to have been determined by the presence of the Vallum as already in possession of the ground; and the road which follows the Wall has been conclusively proved by excavation to be later than the Vallum in date. It was therefore believed[2] that the Wall was an afterthought, due to the discovery that a frontier marked simply by the Vallum was too difficult to patrol efficiently and protect against bands of raiders.

But this is a highly simplified statement of a theory which, taken in its entirety, presented very serious complications. We knew that at one place there was a Wall too many—a turf wall, interposed between the stone wall and the Vallum; it had been suggested that this was Hadrian's Wall, and the stone one that of Severus—for ancient writers ascribe a Wall to each emperor—and the suggestion had been conclusively disproved. We also knew that certain of the forts had been enlarged or rather completely rebuilt on a larger scale, and this enlargement, which certainly took place at an early date, seemed later than the turf Wall and yet earlier than the stone Wall. When all these and other complications were stated, no one but a specialist could keep the theory in his head for five minutes together, and even the most sympathetic continental critics[3] were moved to pronounce the thing *schlechterdings unverständlich* and to deplore the *Planlösigkeit* which it perforce attributed to the Romans.

It is proverbially darkest before the dawn; but some nights manage to get still darker when they have already reached what one might think to be the point of saturation. Since the above theory was formulated, new evidence has come to light which disproves at least

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[1] For a general description of the works, see Collingwood, *Hadrian's Wall, a history of the problem*, *J.R.S.*, xi, 37–66, or *Guide to the Roman Wall*, Reid, Newcastle, 6d.

[2] The whole view is set forth in detail in the article *Hadrian's Wall*, cit. in the preceding note.

[3] I refer to Professor Fabricius, who took endless trouble to understand the English theories during the preparation of his invaluable *Limes* article for Pauly-Wissowa's *Realencyclopädie*.

some part of it ; but, so far, the effect has not been simplification of the problem but a new complication.

This new evidence is the discovery, at one fort,[1] that the fort ditches, while underlying the stone Wall, do not underlie, but stop short of, the foundation of another Wall parallel and quite close to it. This other Wall has been razed to the ground when the stone wall was built, but its foundations were left : and these foundations closely resemble the ordinary stone foundation-course of an earth or turf wall. But they are too narrow to support an earth or turf wall of any considerable size, and they are not identical in plan with the foundations of the one piece of turf wall on the Hadrianic line with which we were already familiar : for that has no stone foundation whatever.

But it now turns out that we had often seen this foundation before. It is a good deal broader than the stone Wall, and it has often been noticed that the stone Wall stands on a foundation that is too broad for it. This broad foundation now turns out to be the foundation of the earlier Wall, which has been in some places demolished so as to build the stone Wall on the same foundation, and in other places allowed to stand until the stone Wall had been built parallel to it.[2]

How do these facts modify the theory ? It is too early to say : but some things can already be said. First, it is more certain than ever that the forts were built before the stone Wall ; but it now appears that they were not built—or at least, this one fort was not built[3]—before the earlier, broad-foundation Wall, but contemporaneously with it. The theory of originally isolated forts, in this case at least, falls to the ground. Secondly, if the forts were built simultaneously with the early Wall, then early Wall, forts, and Vallum seem to be all simultaneous, and we are once more face to face with the problem why two lines—Wall and Vallum—should have been constructed at one and the

[1] Hull, *The Excavations at Aesica*, 1925, in *Archaeologia Aeliana*, 1926, 197–202.

[2] The broad foundation may be admirably seen in e.g. *Cumb. & West. Trans.* N.S. xi, fig. 6 facing p. 404.

[3] This fact is of importance. Great Chesters (Aesica) lies well away from the Vallum, which therefore it does not deflect. It is therefore open to anyone to hold that this fort, and conceivably one or two others, were built not simultaneously with the Vallum but at a later stage in the development of the frontier, when the broad-foundation Wall was added. In this case, the theory above described as holding the field to 1925 requires only two modifications : (*a*) the addition of the early broad-foundation Wall before the stone Wall ; (*b*) the hypothesis that certain forts were added at this stage. Personally, I regard this as the only working hypothesis likely to commend itself to those in possession of the facts as now known.

same time. The theory that one was a military barrier and the other a civil or legal line of demarcation, is hardly plausible, for (i) the early wall, regarded as a military barrier, must have been futile ; (ii) why should not the same work serve both purposes ? Mommsen suggested that the Wall and the Vallum were the northern and southern edge of a strip of ground which was the *limes* proper ; but that is surely a counsel of despair. Had so extraordinary an arrangement been necessary, we should expect to find traces of it on other frontiers. Thirdly, we are now more than ever faced with the problem of dating the stone Wall. If the broad-foundation Wall is Hadrian's, when was it replaced by the stone Wall ? For this we seem entirely without direct evidence.[1] The milecastles and turrets are certainly Hadrianic ; their pottery, their coins, their inscriptions, all prove that beyond a doubt. But do they belong to the broad-foundation Wall or the stone Wall ? I cannot discover that any evidence hitherto recorded settles that point. That they do not belong to the previously-known turf Wall is certain ; but that is not necessarily identical with the broad-foundation Wall. Yet the stone Wall where it runs parallel to that piece of turf Wall is not built on a broad foundation.

These questions are certainly answerable ; but they are answerable only by further and very highly skilled digging. And for my own part I have little doubt that part of the difficulty lies in the fact that different working parties constructed different parts of the line and were allowed a very considerable latitude in methods. To take one example

[1] I should like to discuss a piece of circumstantial evidence on this head ; though to avoid breaking the thread I relegate it to a footnote. The ' centurial stones ' which marked the beginning and end of each section of the Wall built by a century acting as an independent working-party certainly belong to the stone Wall, not to that of the broad foundation. I say this because in character and style they resemble the materials of the stone Wall. Now in Wales, centurial stones are quite common ; they seem to belong to a period going down to, perhaps, about the end of Trajan's reign, when forts were being built in stone. The fashion of dividing up a fort-rampart into lengths and assigning each length to a century may thus be called a Trajanic fashion ; and the Hadrianic forts of the Wall, which belong to a type evolved in Trajan's reign, are thus not the only Trajanic feature on the Wall—the centurial stones constitute another. Now the Antonine Wall was, as I point out below, divided not into centurial lengths but into much longer sections, plainly more economical to build. I understand the transference of a centurial division of labour from Trajanic fort-walls to a great stone wall under Hadrian, and I understand how, being there found cumbrous, it should be replaced by a better division of labour under Pius ; but I cannot believe that, after the Antonine Wall, anyone would exhume a Trajanic method of building forts and apply it in sheer wantonness and perversity to the stone Wall. I infer that the stone Wall is Hadrianic.

only: in general, the Wall is built of small hammer-dressed stones with very little visible tooling, each stone being of a size to be carried by one man. But at Rudchester Mr Brewis lately found, at the north side of the Wall, a handsome moulded plinth,[1] and in the length of Wall lately destroyed in rebuilding the road at Heddon-on-the-Wall the stones of the lowest course are enormous blocks two or three feet long.

If Hadrian's policy was to construct frontier-works intended rather as lines of demarcation than as military obstacles, it may be thought that the stone Wall must belong to a much later period—say, to the age of Severus.[2] But there are strong reasons against this, quite independent of the question (raised above) whether the milecastles and turrets belong to the broad foundation or the stone Wall. And, paradoxical as it may seem, the stone Wall is very far from being a satisfactory military obstacle. It must have been quite 15 feet high to the parapet-walk, and that walk, while broad enough to let sentries pass, cannot have been nearly broad enough to allow troops to march, even in single file, behind men actually engaged in fighting. The parapet-walk was only accessible at the turrets, 500 yards apart: unlike the stone wall of a fort, it was not backed by an earthen bank giving access at every point of its length. Even had the garrison been armed with bows and arrows, which they were not, they could not have defended so narrow and inaccessible a line against determined escalade; and anyone who thinks of the actual armament of Roman auxiliaries will see that they would have been helpless, when perched fifteen feet above ground, against an enemy capable of using archery-fire against them. Perhaps I may here repeat what I have said elsewhere.[3] "The rampart-walk cannot have been more than three or four feet broad, and that is a very narrow fighting-front. There would be barely room for a man to pass behind the actual firing line. . . . It would be practically impossible to reinforce a threatened point, even in the most favourable conditions; wholly impossible to move wounded men. And a few corpses, or a couple of Caledonians who had effected an escalade, would block the walk entirely. . . . Let anyone try to imagine a front-line trench during an attack, with the conditions that the 'trench' is a wall-top

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[1] *Archaeologia Aeliana*, 1925, p. 103 and plate xiv.

[2] My paper on *The British Frontier in the Age of Severus* (*J.R.S.*, xiii), was written before the new evidence at Aesica came to light. But I do not see need to withdraw its conclusions in consequence of the new discoveries.

[3] *The Purpose of the Roman Wall*, in the *Vasculum*, Oct. 1921.

fifteen feet from the ground, and that access can only be had at points 500 yards apart, the turrets taking the place of communication trenches: and he will recognize the impossibility of fighting on the Wall."

The function of the Wall, then, was to serve as an elevated sentry-walk and an obstacle to raiders—to those *latrunculi* on whose account, as we have seen, Commodus fortified the banks of the Danube. If Commodus thought them worth a chain of forts, why should not Hadrian, if Hadrian it was, think them worth a wall ?

Why Hadrian's line was deserted in favour of the old Agricolan Clyde-Forth *limes*, we do not know. The forward move made by Lollius Urbicus in the reign of Pius, about twenty years after the establishment of Hadrian's line, is something of a puzzle. It was once believed that the intention was to form a double frontier, so as to make a defence in depth. Two cases of this, beside the British example, have been quoted, one in Germany and one in Dacia ; but in all three cases the theory is erroneous, for the lines in question were rather successive than simultaneous frontiers. In Britain, there is no doubt at all that garrisons were moved up from the Tyne-Solway line to the Antonine Wall and that the older line was left to a great extent, if not altogether, undefended.

The new frontier was far more simply constructed than the old. Instead of a complicated system of works created by a series of experiments, we find here a simple and economically-planned line, intended from the first to have all the features that it ever possessed, and therefore much better designed than Hadrian's Wall.[1] The Wall itself is of turf in its western portion, of earth and clay in its eastern ; it is based throughout on a stone foundation, about 14 feet broad and well provided with culverts for drainage. It is supposed to have stood about 10 feet high and to have had a parapet-walk some 6 feet broad along the top ; and from time to time it expands into a platform on which no doubt stood the signal-towers that were an essential part of every frontier-system. The mile-castles of Hadrian's Wall have here no counterpart ; but the forts are much closer together and more regularly spaced ; whereas Hadrian's average 5 miles apart and are sometimes separated by as much as 8 miles, those on the Antonine wall come at fairly regular intervals of about 2 miles. They are variously built ;

[1] The chief work is Macdonald, *The Roman Wall in Scotland*, which summarizes all knowledge to 1911. Later additions by the same author are published in *Proc. Soc. Ant. Scot.* 1914–15 and 1924–5, and by Miller, *The Roman Fort at Balmuildy*, 1922.

some have ramparts of stone, some of turf, some of earth ; whereas on Hadrian's line all the forts have stone or rather composite ramparts of stone with an earthen or clay bank behind. Another difference is that the barracks of the forts on Hadrian's Wall are of stone, those on the Antonine Wall of wood.

The most interesting feature of the Antonine Wall, however, consists of the so-called ' distance-slabs ' which mark the sections in which it was built.[1] There are seventeen of these ; they are good-sized slabs, each bearing a certain amount of decoration—the badges of legions, victories, and so forth—and an inscription recording the erection of a stated length of the Wall by such and such a unit in the reign of Antoninus Pius ; the name of the emperor being omitted from one slab only. The series includes pairs of duplicates, and these were placed one at each end of the length to which they refer ; also a set of four referring to a length somehow shared between two working-parties, each of which set up a slab for itself at each end of the length concerned. There were six working parties, two drawn from each of the three British legions ; an arrangement in striking contrast with that by which Hadrian's Wall (the stone Wall) was divided into minute fractions each built by a single century. The distance-slabs of the Antonine Wall, under Sir George Macdonald's patient analysis, have yielded a remarkably complete and convincing account of the methods by which the northern barrier was constructed.

Something of the history of Lollius' *limes* can be made out from the remains found by excavation in its forts. It was certainly constructed about 140–143, and as certainly abandoned about 181, as a result of the great rising of Caledonians and Maeatae mentioned in Dio (or rather, in Xiphiline's abridgment of Dio) as taking place in that year.[2] An attempt has lately been made, it is true, to argue that it was held much later. The evidence on which the main Roman occupation of Scotland was dated to c. 140–180 was in the first instance that of coins, as interpreted by Haverfield in 1899.[3] At that time, accurate dating by the styles of pottery was in its infancy, and the evidence of coins was the only kind that was available for the purpose. Now it has been argued[4] that coins, under the Roman empire, travelled slowly

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[1] Macdonald, *The Building of the Antonine Wall*, in *J.R.S.* xi, 1–24.
[2] lxxii, 8.
[3] *Antonine Wall Report* (Glasgow Archaeological Society).
[4] Foord, *Last Age of Roman Britain*.

from hand to hand, and took something like 30 years to reach so distant a region as Scotland. The cessation of coins at or about 180, therefore, would prove not that the Antonine Wall was given up then, but that it was held something like 30 years longer, that is, till Caracalla and Geta broke off operations in Caledonia on the death of Severus in 211.[1] This theory, however, is based on a mere guess. Its author adduces no single shred of evidence in its favour, except two points neither of which supports it : first, the view of Dr J. G. Milne that coins reached Egypt about five years after they were minted in Rome,[2] and secondly, Macaulay's[3] anecdote of the Lancashire quaker, who in the seventeenth century brought undepreciated coins to London some thirty years after depreciation had set in. It is hardly necessary to point out how far these arguments are from proving a thesis which, if true, would be easily provable. In point of fact, it is easily and conclusively disprovable, not only directly by reference to well-known facts but indirectly, because if it were taken seriously it would soon contradict itself[4].

It is certain, then, that the Antonine Wall was finally evacuated, as such, in or about 181. But before that date it is archaeologically certain that many of its forts had been destroyed and rebuilt. About 155, we know from coin evidence that war was going on in Britain, and with this may be connected various records of activity about 158 by the imperial governor Julius Verus, who restored at that time a number of forts presumably destroyed, to judge from their distribution, by a Brigantian rising.[5] Pausanias, too, has a reference to a Brigantian war of Antoninus Pius, which may belong to this time.[6] It seems very possible that this rising resulted in the visible damage to the Antonine Wall. Here and there a second period of destruction and rebuilding has been traced, and these would fall into line with the British war described by Capitolinus[7] as having been conducted by Calpurnius Agricola. Inscriptions certainly prove that Calpurnius Agricola was active in Northumberland.

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[1] Foord, *op. cit.* pp. 32, 50.
[2] *J.R.S.* x, 172.
[3] *History of England*, ch. xxi.
[4] See the reviews by Oman in *J.R.S.*, xvi, Macdonald in *History*, April 1926, and Collingwood in *Eng. Hist. Review*, April 1926.
[5] Haverfield in *Proc. Soc. Ant. Scot.*, 1904, 454 seqq.
[6] viii, 43, 4.
[7] *Marcus Aurel.* 8, 7.

The final evacuation was certainly due to a disaster. The Wall, says Dio,—he does not say which wall—was broken through, and a Roman general—the word seems to mean the governor himself—fell in battle. Archaeology shows that both Walls were in fact affected, and much else beside. Recent excavations actually suggest that the fortress of York fell ;[1] and that is quite consistent with Dio's story, for York seems to have been the military centre of Britain and the natural residence for a governor when engaged in military work. Commodus, we are told, was panic-stricken, which again is consistent with the fall of York ; and he sent one Ulpius Marcellus to retrieve the disaster. I have argued elsewhere that what Marcellus did was to restore Hadrian's Wall and such of the forts south of it as were necessary for its security.[2] Nearly a generation later, Severus came over to take the field in person against the Caledonians, and literary tradition ascribed to him the rebuilding or even the original construction of Hadrian's Wall. The evidence of inscriptions makes it wholly impossible to take this literally ; but Severus did no doubt set the frontier-system on its legs again to some extent, though his actual operations suggest that he wished to imitate Agricola rather than Hadrian and to complete the conquest of Scotland.

After the campaigns of Severus, ending in his death at York in 211 and his sons' abandonment of the half-finished work, there was a long period of peace, for all we know to the contrary. The forces opposed to Rome were gradually shifting and forming themselves into new shapes, and these new shapes only began to manifest themselves towards the end of the third century. Not that the intervening period was wholly peaceful ; it was not ; but the centre of interest now begins to move. About the years 270–280 two new factors appear : the Scots of Ireland and the Franks and Saxons of the North Sea. About 270 the Irish, according to their own account, were planting colonies in Pembrokeshire, and there is a good deal of evidence for unrest on the west coast of England about this time. Simultaneously the Saxons began raiding down channel. The result was a gradual inversion of the position on the British frontier. Hitherto the south of Britain had been in constant and close touch with Gaul and, through Gaul, with Rome : her enemies had been on the north, away across the Wall.

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[1] Or at any rate, that not long after 182 it was rebuilt. Miller, *Roman York*, *J.R.S.* xv, 185.

[2] *The British Frontier in the Age of Severus*, *J.R.S.*, xiii.

Henceforward the Wall was only one of her frontiers, and perhaps not the most important: her most active enemies were engaged in cutting her adrift from the continent, and she had now to defend herself on all sides.

This changed situation shows itself dramatically in the reign of Carausius, the naval commander who made himself emperor in Britain and, for the first time since A.D. 43, reminded the world that Britain was an island. He was forced into this position by the Saxon sea-power, and his severance of Britain from the empire is as it were the anticipation of its final severance, more than a century later. We do not know when the great forts of the Saxon shore, the forts that defended the southern or maritime frontier of Roman Britain, were built: they were probably not all built at once, and it is a reasonable guess that their systematic organization was due to Diocletian and his colleagues at the turn of the third and fourth centuries.

Thus, in the fourth century, we have the Wall to northward; the Yorkshire signal-stations to north-east[1]; the Saxon Shore forts from the Wash to the Isle of Wight,[2] with outliers of the same type at Cardiff and probably at Holyhead;[3] and in Wales a series of Romano-British fortified hill-towns, apparently co-operating with the Roman garrison proper against the Irish.[4] Roman Britain was playing a losing game, into whose vicissitudes this is not the place to inquire. It must suffice to say that the game was played and lost. On any showing, the Wall was given up before the defences of the province finally fell; according to the present writer's view, the first took place about 383 and the second gradually after a severance of direct relations with the continent that occurred about 410; but the matter is much debated at present and the details are little to our present purpose.[5] Our outline of the various phases of frontier-policy adopted by the Romans in Britain is complete, without any determination of the exact point at which the twilight of fifth century history passes into darkness.

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[1] Haverfield, *Roman Coast Defences of Britain*, *J.R.S.*, ii. Collingwood, *The Roman Signal-station on Castle Hill, Scarborough* (pamphlet, 2d.)

[2] Mothersole, *The Saxon Shore:* Haverfield, *Litus Saxonicum* in Pauly-Wissowa.

[3] Wheeler, *Segontium* (*Y Cymmrodor*, xxxiii, 97–101).

[4] Wheeler, *Roman and Native in Wales* (*Trans. Cymmrodorion Soc.* 1920–1).

[5] See e.g., Bury, *The Notitia Dignitatum*, *J.R.S.*, x.; Collingwood, *The Roman Evacuation of Britain*, *J.R.S.*, xii; Foord, *op. cit.* and reviews by Macdonald (*History* Jan. 1926), Oman (*J.R.S.* xiv), and Collingwood (*Eng. Hist. Rev.* Jan. 1926).

# Orientation

by Vice-Admiral Boyle Somerville, C.M.G., F.S.A.

THE term " Orientation," as applied to a structure of any kind, means the direction in which its principal line is laid out on the ground. Originally, as the word implies, orientation signified " eastwardness," only, and had special reference to churches, because (in western Europe) practically all churches were built with the longer side laid out in an east-and-west direction. In some, the line is to True East, exactly ; in others the axis lies at an angle of some degrees either to the northward or to the southward of True East. This divergence in either direction from the Orient is called " the angle of orientation." Nowadays, the term " Orientation " has lost its original " Eastward " distinctiveness, and has become a general expression merely indicating " direction," and may imply any point of the horizon, and not necessarily the eastward.

Originally the angle of orientation was measured from True East as a zero, but now it is reckoned from the Meridian, or North (true).[1]

During many centuries maps and charts have been drawn with the North end uppermost, and with " East " relegated to a side position. Consequently we find it a little difficult to realise that, anciently, East was the principal direction. We may surmise that the change

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[1] Technically speaking, an angle reckoned from the Meridian is named an AZIMUTH, and is stated in degrees, minutes, and seconds of arc from 0° to 360° round the circle in the direction taken by the hands of a clock. This, the modern method of reckoning, is considerably the clearer and simpler.

An angular measurement reckoned from True East, or West is named an AMPLITUDE, and is stated in degrees up to 90° to the northward or up to 90° to the southward of East or West. Thus, it requires to be set down as " E——N " or " E——S ", as the case may be (and from West in like manner).

The term BEARING is often seen used in reference to a direction, but, strictly speaking, this is a nautical term, and refers properly to the Mariner's (magnetic) Compass. It is the angle from Magnetic North, or Magnetic South for 90° each way towards East or West (magnetic), and requires to be stated as " N——E," " N——W," " S——E," or " S——W " as the case may be. It should never be used in describing orientations, which infer a True, and not a Magnetic direction.

came about gradually, perhaps partly for the sake of the navigator, when the use of the magnetic compass was discovered, whose needle made a principal point of " North," and partly the change may have seemed to be rational, when the fact of the rotation of the Earth on a North and South axis was established. But in early days, the point of reference seems to have been East, namely that important part of the horizon at which sunrise took place.

When we go back into human history, we may find a practical reason for the importance of sunrises, and a special regard for the East, or Orientation.

In neolithic times, mankind was gradually giving up his " Ancient Hunter " form of nomadic existence, and was beginning to look to agriculture to provide him with some food.

" Farming," if we may so term these beginnings, necessitated the living, year in, year out, on the same spot, if only in order that the sower might be also the reaper. When thus established, the obvious inter-connexion of the annual movements of the Sun with the times of seed-time and harvest must soon have been remarked. Owing to this observation, the desire must next have arisen to establish a Calendar which should indicate what the connexion was between the Sun and Agriculture. Under primitive conditions this could be effected only by noting the daily change or movement of the point of sunrise along the eastern horizon together with the corresponding annual progress of the crops. (The observation could, of course, have been made as easily by noting the movement of sunsets, in the West ; but it is more likely that the daily *return* of the Sun, and not its daily departure, is what would appeal to primitive people).

We may now consider the manner in which this first " Orientation Calendar " may have been made. To do so, let us imagine ourselves as seeing things with the eyes of these first " astronomers." Let us suppose that we are placed in the midst of some great fertile plain, such as that of Mesopotamia, with an eastern horizon line of distant mountains, whose peaks are silhouetted against the morning sky, and that from some fixed point within this plain, we are regarding, morning by morning, the sunrise. On the first morning the Sun is seen to rise (let us say) immediately behind peak A of the horizon line. A few mornings later, it rises behind peak B, a little to the left, as we regard it, of peak A. A few days later still, it is seen to rise still more to the left, behind peak C, and so on, until, after many days, a peak on the horizon is reached, farthest to the left, where, for a few days, the sunrise peak

is the same (or nearly) on each successive sunrise—it is the time of the Midsummer Solstice, of great heat, and of long days of sunshine. Then would be seen to begin a retrograde movement of the position of sunrise, namely to the right day by day, past peaks C, B, and A, in that order, and further on still to the right, until at the end of what we term " six months," a sunrise point furthest to the right is reached, where again there is for a few days little or no change in direction of rising —it is the Winter Solstice, the time of coldness, and of short days. And so on, with regularity, a constant daily movement of sunrise point in both directions, with a slight pause at the end of each travel.

We may presume that the next step in " astronomy " would be to count the number of sunrises between the two ends of the sun's path along the eastern horizon. Then, dividing that number by two, the sunrise peak of the middle day would be noted ; the time when days and nights were of an equal length—the Equinoxes of Spring and Autumn, denoting (in some latitudes) the times for sowing and for reaping, respectively. Then, as agriculture became less simple, or because, with the spread of knowledge into other latitudes the operations of sowing and reaping required different, or additional dates in the growing Calendar, the halving of the numbers of sunrises on each side of the Equinoctial peak on the horizon would provide two more calendar dates for agricultural operations ; one to the left, midway between Midsummer Solstice and Equinox, and one to the right, midway between Midwinter Solstice and Equinox. When this was effected, there would be a division of the whole year into eight sections of 45 or 46 days each, terminating in dates that we still recognize and name as the four " quarter days " and four " half-quarter days." So far as the present discussion is concerned, the point about them is that they originated, in all probability, through observation of sunrise points along the eastern horizon, and were the original points of Orientation.

So much for the primitive calendar of the Sun. The Moon, in ancient times (at all events in the countries between the eastern Mediterranean and the Persian gulf) was certainly employed as a time-measurer, a fact perpetuated in England by our word " month." The necessary observations of the Moon for this purpose could not have been by its risings (or settings) because, except on the day of full moon either the rising of the Moon, or its setting, or both, take place during daylight, and so are not visible. Orientation, consequently,

cannot probably be connected with moonrises, except, perhaps, on certain full moon days.

When we consider the Stars, however, their connexion with Orientation, and with sunrises, is fairly clear. Stars rise at (practically) the same azimuth at each revolution of the Earth on its axis. (There is a slow change in azimuth, due to Precession ; but except to an observer provided with an instrument of precision, it would not be noticeable). For this reason, the rising point of any particular star would fix a point on the horizon for the primitive observer as definitely as the " mountain peak " that we have imagined. Thus the position of sunrise (or of sunset) on any date may be referred to the particular star that rises (or sets) at the same point as the Sun on that date. In this fact lies the origin of the Zodiac, which is the belt of stars within whose limits the Sun apparently rises and sets throughout a year. Stars rise about 4 minutes earlier at each revolution of the Earth, so that in one year the point of sunrise (or of sunset) passes through the whole 360° of the Zodiac. There is too much light on the horizon at the time of sunrise (or sunset) actually to see at that moment any particular star rising or setting, but the group of stars, or " constellation " which is seen immediately before dawn (or immediately after sunset) directly behind the Sun at its rising or setting is the " Sign of the Zodiac " of that time of year. Sunrise or sunset of any date may thus be referred to the rising or setting of one of the Zodiacal constellations, and, in particular, to any specially bright star within it (many of which have special names, anciently bestowed), as these would be the last stars visible in the sky before the sun rose, and the first to be visible in the evening twilight after it had set. In early astronomy, such stars were said to be rising or setting " heliacally." For these reasons, Orientation can be referred to a star-rise as much as to a sunrise.[1]

By the time of the classical authors B.C., the agricultural divisions of the year were, in certain regions, well established (*e.g.* the connexion of the heliacal rising of the Pleiades with the date of the Spring sowing in northern Italy). As to the beginnings of this knowledge, we are not able to date, even approximately, when sunrise and star-rise observations began to be made ; but from reasoning connected with

[1] It may be remarked that there are, besides the Zodiacal stars, certain well-known bright stars that rise and set further north, along the horizon, than the Sun at the Summer Solstice, or that rise and set further south than the Sun at the Winter Solstice. These stars may possibly be connected with Orientation ; but there is as yet insufficient evidence of its occurrence.

precession the Zodiac (the very nature of which implies the long-previous existence of such observations) must have been known in Mesopotamia as early as 5000 B.C. In western Europe man was then in the earliest stages of culture, and remained so until about 2000 B.C., but it is conceivable, and even probable, that during those millennia some knowledge of eastern agriculture slowly filtered westward into the savage world of Europe, and with it the knowledge of marking the seasons by sun and star-rises. We ought not therefore to feel surprise at finding traces of that knowledge in prehistoric remains in these Islands. This excursion into ancient astronomy has been necessary not only to realize the origins of Orientation, but also to point out the principal dates of the primitive calendar,—the " quarter-days " and " half-quarter days." We have now to apply this knowledge to prehistoric archæology.

During recent years the writer has made surveys of a considerable number of megalithic structures in these Islands, and of a few in France. The plans of many (but not of all) of these ruins, when plotted on paper, show undoubted indications of " precise " orientation. By the term " precise " is meant that these structures are laid out not only in general fashion to the Eastward or Westward arcs of the horizon, but that either,

(1) Their axial lines are precisely directed to sunrises (or sunsets) of the quarter days, or half-quarter days of the Calendar, or,

(2) From some well-defined position within the structure, or, in the case of a Barrow, from some spot upon it, a line of direction is made observable, by some means, to a distant object, natural or otherwise, which line is also precisely that of sunrise or sunset of a " Calendar " day.

Many observers have noted this fact of orientation in the monuments of antiquity ; it is no new discovery ; but as its existence is still largely doubted, every new detail respecting it is of value. Most, if not all, of the existing megalithic monuments are graves, or monuments of the dead. The only ones whose funerary character is doubtful are single Standing Stones, Stone Rows of 2, 3, 5, 7, etc., standing stones, and perhaps, some Stone Circles.

For what reason any of these structures should have been given " precise " orientation we do not know. Such, however, is the case.

That there is an ancient connexion between Death and Orientation is certain, for the custom still exists in the Christian world—a custom without any definite explanation—of laying the dead in the ground with their feet "towards the East"; they are, in fact, "orientated." The church around which the dead are buried is usually orientated also; but this is because churches (in western Europe, at least) have their origin, as a structure, in tombs. The first Christian missionaries in Rome were men of Jewish origin, and, instead of following the surrounding (heathen) custom of cremation of the dead, they buried, or rather, entombed the bodies of the first martyrs of the New Faith. This may partly have been in accordance with their own native custom of disposing of the dead, but no doubt had also in view the preservation of the body for Resurrection Day, then believed to be imminent. The tombs of these first martyrs were placed in the Catacombs, and there became the first altars of Christianity. A recollection of this is still maintained, for, even in the present day (in the Roman church), the relic of some dead saint is deposited in every consecrated altar-stone; so that, to that extent, a church may still be regarded as a "tomb." Whether in the Catacombs the altar-tombs were placed in any "eastward" position or no, the fact is that when upper-air churches came to be built the custom arose and spread of placing the altar at the East end. The Christian faith does not, of itself, demand that the worshipper should face himself in any particular direction, and, in establishing such a custom, we may probably see a picturesque symbol of the resurrection of the body as represented in the daily resurrection of the Sun out of the nether darkness; in the direction of which spectacle the devout should be turned. Among Eastern peoples the belief in Resurrection is far older than the beginnings of Christianity (*e.g.* Ancient Egypt), and we may probably see in Christian orientation, as established by these Jewish missionaries, the revival, or the adaptation to the new religion, of some ancient Palestinian belief and custom.

To return now to megalithic monuments. It was stated above that while some certainly have "precise" orientation, others have not. Of these latter, it should be said that there are two other means besides the "precise" solar method by which orientation can be effected, neither of which has yet been fairly investigated.

(1) By stellar orientation, with special reference to the stars outside Zodiacal limits, such as Capella, Arcturus, Sirius, etc.
(2) By orientation in some non-astronomical direction.

By method (2) is meant the laying out of the dead so as to face in some *terrestrial* direction, such as towards some sacred and adjoining site, or towards another country, such as, in the case of a warrior, that of his foes ; or, as in the case of an immigrant race, the land from which they had come,—the direction of the road home.

Instances exist of both of these " orientations "; and the latter is well known in the South Pacific Islands, where the dead are commonly taken to the westward parts of the island they inhabited, this being the direction from which the race originally reached it. All invasions of the British Islands were necessarily from some eastward direction ; and this may possibly account for the directions in which Long Barrows (to quote but one example of prehistoric grave) are laid out ; that is to say, nearly all of them directed to some easterly point, but some markedly northward of East or southward of East—and not on " precise " orientations.

Seeing that it still is customary to orientate the dead,—though no longer " precisely " followed,—there is nothing inherently improbable in the supposition that it was also customary with our ancestors of the Neolithic and Bronze ages.

Again, the fact that early man buried or entombed his dead, and in most cases supplied grave-furniture shows that there then existed belief in a life beyond the grave.

And if survival after death was believed in, the idea of resurrection almost logically follows. Orientation to a rising sun, or star, clearly typifies this idea ; while orientation to a setting body (which also occurs in prehistoric monuments) perhaps typifies the belief of some different, and gloomier-minded race, in a final descent to some under-world to the westward.

Here, then, is a field of investigation of which the results would provide at least one more contribution towards the unravelling of neolithic problems, and even, perhaps towards the allied problem of the early migrations of races. Even if the surveyor of a prehistoric structure should be of opinion that there is " nothing in " Orientation, still the direction in which the structure is laid out on the ground should be accurately reproduced in the resulting plan, if only in the interests of scientific completeness. Until this is done, the matter will never be settled as to whether, in fact, there is, or is not Orientation in these structures of antiquity ; and if there is, wherein it is expressed. It

seems impossible that the instances of " precise " orientation already published should be the result of mere chance ; and, as hinted at above, if the fact of Orientation can be raised above all doubt, there is a great deal more in the subject than is contained in the mere discovery of it.

There is another problem latent in Orientation, namely the possibility, on astronomical grounds, of arriving at the date of erection of a monument. An article dealing with the subject, with special application to Stonehenge, appears in the present number of ANTIQUITY (" Stonehenge considered as an Astronomical Instrument," by A. P. Trotter). The writer of these notes finds himself in full agreement with the conclusions come to by Mr Trotter ; yet a few remarks on the subject, both on general lines, and particularly as regards Stonehenge, may be of interest.

Even if we accept (as many do not) that there is in any prehistoric structure an intentional orientation to a rising or setting body, it may confidently be said that it is not possible to ascertain the date of erection of any such monument through a *solar* orientation.

The chief general reason for this is that we do not know,—and probably never shall know—what *particular moment* of the phenomenon of sunrise was chosen by the builders for the laying out of the desired line on the ground that was to be the orientation of the building. Mr Trotter has referred to this in his paper. The importance of possessing this knowledge lies in the following facts:— Owing to a certain movement of the axis of the Earth, the effects of which are known as " Precession," the azimuth of sunrise is steadily and perpetually changing, and it is on the knowledge of the amount of this change that the theory of the dating of a monument is based. The change in azimuth is exceedingly small, and at the latitude of Stonehenge is rather less than half of one diameter of the sun, measured along the horizon, in 1,000 years.

Now, at the latitude of Stonehenge (for example) at the time of the Summer Solstice, between the moment when the " first flash " of the sun's upper rim is sighted, and the moment when the whole sun is seen standing (as it were) on the horizon, the sun changes its azimuth by about $1\frac{3}{4}$ diameters along the horizon. So that the date arrived at by accepting " first flash " as the proper moment for observation, differs by nearly 4000 years from that arrived at by considering " whole orb visible " as the moment. " First flash " is just as likely a moment as " whole orb." We do not *know* which to employ, and this it is which

makes dating by azimuth of sunrise, whether at Stonehenge or anywhere else, impossible.

With regard to Stonehenge in particular, and the so-called " Axis " upon which the determination of date has been based, there are certain considerations that may be offered. The first of these is as follows :— The partial excavation made at the site during recent years has made it clear that there are at least three different structures included in " Stonehenge," built at widely differing dates. There is

(*a*) The earth vallum and ditch, to the date of which possibly belong the un-trimmed sarsen blocks still remaining, namely the Heel Stone, the Slaughter Stone, and the two stones numbered 91 and 93, erected just inside the vallum, on opposite sides of its circumference.

(*b*) The blue-stone Stone Circle and " Cove," when in their original positions, with the stones un-trimmed, as imported.

(*c*) The blue-stone Stone Circle and " Cove," in their present position (partly trimmed). To this period possibly belongs the ring-fence of great sarsens that surrounds the blue-stone Stone Circle and Cove, and the trilithic sarsen Cove itself, trimmed, morticed, and tenoned.

The first named of these structures, the Earthwork ring, belongs, almost certainly, to a very early date in the neolithic period, while the great trimmed sarsens, with almost equal certainty, belong to quite a late date, possibly just before the opening of the Bronze Age. Two or three thousand years may separate these two parts of Stonehenge. To which of them does the date arrived at from the azimuth of the " Axis " belong ?

Reference to the Stonehenge " Axis " brings us to another consideration with regard to the calculation of date. Axis is defined as the line which divides a regular figure symmetrically, and thus, in the case of a Circle, it must pass through the centre. If the plan of Stonehenge published by the Ordnance survey in 1867 be examined critically, and also the plan published in the *Antiquaries Journal* of January 1926, accompanying Col. Hawley's Report on Stonehenge, it will be seen that the position of the centre of the circle of the great trimmed sarsens differs from that of the centre of the blue-stone Stone Circle by about 2 ft.

The scale of either plan is too small to admit of any high degree of accuracy in stating the amount of the discrepancy ; it is sufficient

to show, however, that the " Axis " of the sarsen ring is not the same as the axis of the blue-stone ring, so that on this point also, the mathematical calculation of " dating " stands condemned.

The third observation to be offered is of an archæological nature. The writer has made, at different times, accurate large-scale plans of 27 Stone Circles in the British Isles. In not one case are the stones composing the ring placed in a true circle ; that is to say, it is not possible to draw a line joining all the stones which is mathematically circular. The best that can be done is to draw two concentric circles, forming a band, wide or narrow, within which the stones forming the ring may fall. This is the case with the blue-stone ring at Stonehenge. The eight stones remaining *in situ* do not stand on the arc of a circle, but lie between the limits of two concentric circles, 4 ft. apart. It is the common centre of these circles that is referred to above. Strictly speaking, the figure formed by the stones has no single central point, and consequently, no " axis."

A further point is this. Of the 27 Stone Circles above mentioned, seven still retain the means by which Orientation was introduced into the structure. The remaining 20 are either too greatly ruined to exhibit their orientation, or else they never possessed this feature. In each of the seven cases the alignment for orientation is made definite by means of getting certain stones of the " circle " in a line. There is no imaginary *unmarked* line such as the " axis " postulated for Stonehenge. Always there is an actual, megalithic " fore-sight " and " back-sight," and sometimes a " middle-sight " as well. The method is as simple as it is obvious. The alignment is made across the middle of the ring of stones, from one side of it to the other, along what, if they truly were *circles*, would be called a " diameter," and the stones to be employed for the purpose of the alignment are indicated, usually, by being considerably larger than the other stones of the ring, and (in one case) the " fore-sight," or stone nearest the sun in taking the observation, was engraved all over with " cup-markings." In two cases, an additional standing stone was placed at a short distance outside the actual Stone Circle, to form a third stone on the alignment, so that there could be no doubt as to the intention of the orientation.

Why, then, at Stonehenge should we expect to find a sunrise alignment *not* marked out by actual sighting stones ? It may be remarked that there is, indeed, a possibility that a summer solstitial alignment was actually marked out at Stonehenge. If the Slaughter

Stone ever stood upright, the line it makes with the Heel Stone is that of solstitial sunrise ; and if this supposition as to the Slaughter Stone is correct, excavation should reveal a stone-hole in the chalk on the side of the vallum on the opposite side of its circumference in the vicinity of stone-hole " X 28 ", where an un-trimmed sarsen once stood that would complete the alignment, passing over the middle of the blue-stone Stone Circle.

But even so, if ever the excavation of the site is completed, and this stone-site recovered, it would still be impossible, for the reason connected with "first flash" and "whole orb" discussed at the beginning of these notes, to calculate from the azimuth of this line a date for the blue-stone Stone Circle, or for any part of Stonehenge. If a definitely certain *stellar* orientation could be found, a date might be calculated from it, with a margin of accuracy of, say, 50 to 100 years. But this opens up astronomical questions that cannot here be discussed.

Complete excavation would inform us also, as to whether Stonehenge is, as many have supposed it to be, the sepulchre of some important person, either as an original burial at the time of the making of the earth vallum, or a later " intrusive " burial when the imported blue-stone Circle was set up. If so, the undoubted aspect of the Cove to the summer solstitial sunrise would make one more connexion between Orientation and the Dead. The subsequent great edifice of trimmed sarsen surrounding the site would then become more understandable. In similar fashion, after a similar lapse of about 1500 years, arose majestic St. Peter's at Rome over the once humbly interred bodies of St. Peter and St. Paul.

Perhaps the prehistoric Sir Christopher Wren who designed and set up the huge pillars with their lintels himself, also, lies within, proclaiming—in the literal sense—to a wondering posterity, " Circumspice."

# Stonehenge as an Astronomical Instrument

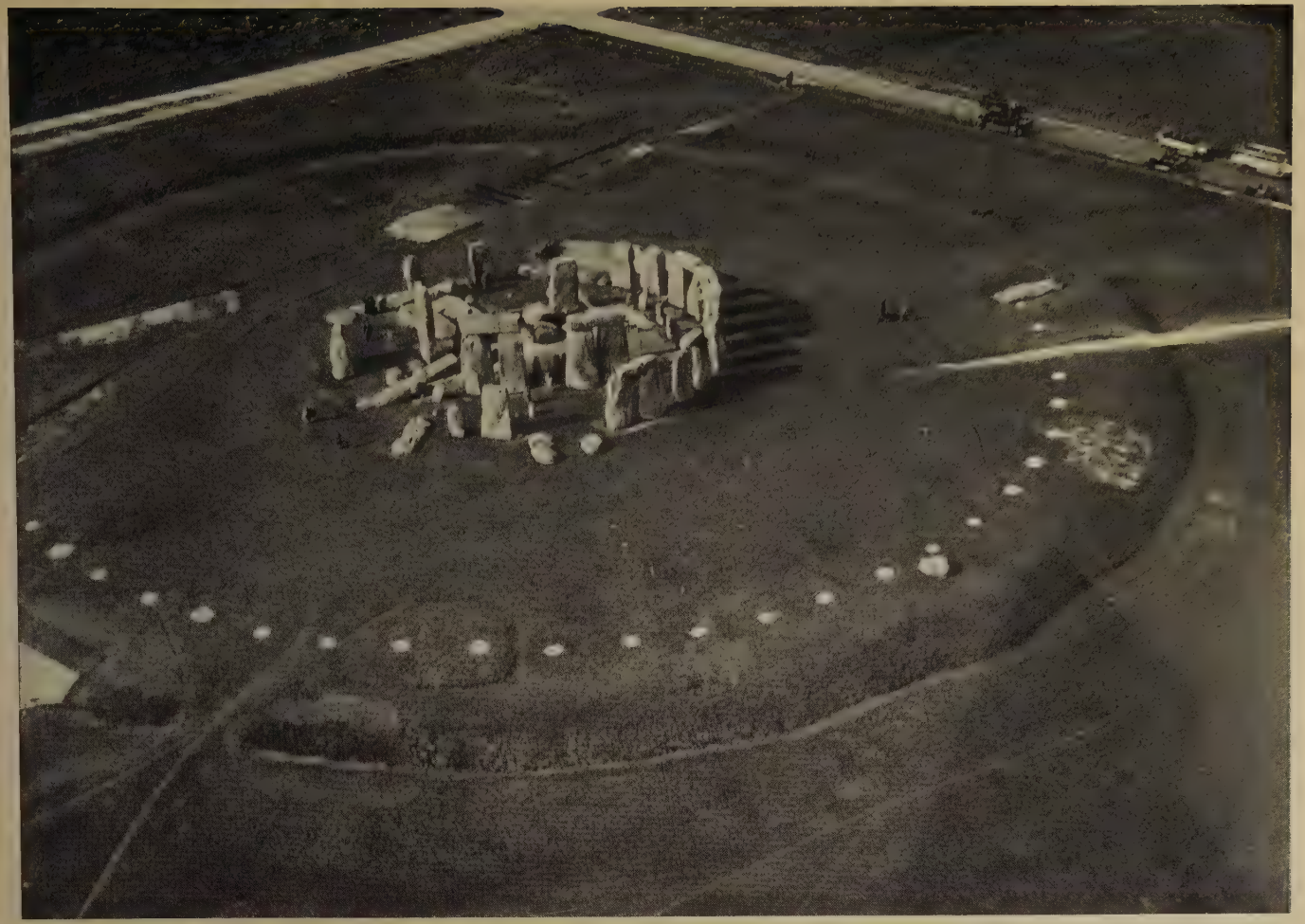
by A. P. Trotter

THE astronomical controversy about Stonehenge may perhaps be approached from an impartial view of one who is neither an archæologist nor an astronomer, who offers no new or original observations, and proposes to examine facts rather than to discuss theories.

Sir Norman Lockyer was one of those who held that many Egyptian and Greek buildings were set so that they faced certain points on the horizon at which the sun or some bright star arose. But the buildings do not face these directions exactly, and the suggestion is that the discrepancies are due to a well recognized astronomical principle—that the points of rising and setting gradually move on the horizon ; and the rate of motion being known, the date of the building may be ascertained.

We are faced, at the outset, by two suggestions : that these structures were intentionally placed in these directions, and that they were built at these dates. The first is supported by the facts,—supported, not rigorously proved,—and the second is open to verification where historical data are forthcoming.

As when an archæologist beginning to excavate a site, digs through stones, mud, rubbish, and perhaps rock, and throws on one side all that contains nothing of worth to him, so he has to work through vague guesses, conjectures, old wives' tales, and even profound theories, and accept or reject them in his search for pertinent facts. One man's rubbish may be another man's treasure. Old wives' tales and traditions accurately compared and intelligently related may form a contribution to folk-lore, to the history of mankind, and to anthropological and ethnological science. On one solitary fact a wonderful edifice of speculation may be raised ; on the other hand, a patient accumulator of facts may labour for years, and have no more capacity for making any advancement in knowledge than if he had collected postage stamps.



STONEHENGE: OBLIQUE VIEW FROM AN AEROPLANE, TAKEN 23 SEPTEMBER 1926, BY 422 FLIGHT, R.A.F. BASE, GOSPORT

*Reproduced by permission of H.M. Stationery Office*

*facing p. 42*

The arrangement of the stones, the causeway of approach, and the so-called avenue of Stonehenge face towards the north-east, and more particularly towards the most northerly point on the horizon at which the sun rises at midsummer. On this general fact has been based the theory that Stonehenge was a temple for sun worship. Neither in Lockyer's *Stonehenge and other British Stone Monuments*, though it contains chapters on " Where did the British worship originate," and on " A short History of Sun-Temples," nor in any other writings that I have seen, can I find evidence of any institutional sun-worship in Britain, or sufficient proof that Stonehenge or any other stone circle was used as a place for public worship. There seems to be nothing but vague conjecture about the religion of the inhabitants of Britain until the time of the Druids, and the interval between the building of Stonehenge and our earliest account of the Druids is perhaps some 2,000 years. It may be that " going to church " did not play an important part in the religion of those days.

The popular tradition is, that on the longest day of the year the sun, as seen from the interior of Stonehenge, rises exactly over the Heel stone ; and " therefore " Stonehenge was a temple for sun-worship. In the spring, the sunrise is in the east, and as summer comes on, its place on the horizon moves, at first quickly, and then more slowly towards the north, and it creeps up to the northernmost point which is reached on about 21 June, and after that it returns southwards. What is exactly meant by its " place of rising " will be discussed later. The tradition cannot be traced back for more than about 150 years, and it is certain that the sun never did rise over the Heel stone when observed at midsummer from the direction chosen by Lockyer, and will not do so until about 500 years hence. (By a slip of the pen, Mr E. H. Stone puts this at 1,000 years).[1] On that sunrise morning, may Stonehenge be there as it is to-day, and may all the deserted buildings and rusty derelict sheds in its neighbourhood have utterly disappeared !

As an astronomical instrument, Stonehenge consists of a pair of " sights " like those of a rifle. The fore-sight is the pair of stones (nos. 30 and 1) forming the entrance. The back-sight *was* the pair of stones forming the largest trilithon (that is a set of two upright stones and a lintel or cross stone resting on them), but of these only one, the tallest of all the stones (no. 56) is standing. For many years it was leaning, and was set upright in 1901. Its companion (no. 55) fell before

[1] E. H. Stone, *The Stones of Stonehenge*, (1924), p. 130.

Stonehenge attracted the notice of antiquaries in the seventeenth century. There was another pair of stones, forming part of the outer circle, but only one of this pair (no. 16) remains, and it was not so important a back-sight as the great trilithon. (Fig. 1).

When Lockyer made his investigations in 1901, the great stone (no. 56) was still leaning, and it is possible that he considered that on this account it was of no great value for his purpose, although it was leaning in the direction of the entrance or the pair of stones which may be called the fore-sight. The Heel stone, about 205 feet from the entrance, was obviously no use as a fore-sight, it is too much to the right. In order to see it set midway in the entrance, you must stand with your back to the great stone, and at about six inches from its right hand (south-east) side.

Lockyer disregarded the stones altogether, and chose to adopt as his line of sight or axis the alignment of part of the indistinct earthwork called the avenue. This irregular earth-work, unnoticed by visitors whose attention has not been called to it, can be traced for a considerable distance, and photographs taken from the air show it curving to the right and ending at the river Avon. Mr Stone has examined it for 1,290 ft., and has made measurements over 750 ft. of its length, and considers that the true centre line cannot be determined with certainty until further excavations are made. It should be observed, however, that the direction, and not the centre line, is what Lockyer wanted. He seemed satisfied with it, and placed two pegs 140 ft. apart near the beginning, and four others averaging 100 ft. apart towards the north-east. The discrepancy between the two directions only amounted to one in 620, or, as he states it, 5 minutes 40 seconds of angle. He took the mean of the two directions as his line of sight.

I shall refer to this again later, but I prefer to deal with Stonehenge itself for the following reason given by Mr Stone in his book :—" The Axis of the main structure of Stonehenge as erected by the builders is a line passing midway between the stones nos. 56 and 55 of the central trilithon, and midway between the stones 30 and 1 of the outer circle." " It is obvious " writes Mr Stone, and there I agree with him, " that the term ' Axis of Stonehenge ' would be meaningless as applied to any other line." [1]

The difficulty at once arises that stone no. 55 has fallen, and though the great stone no. 56 is probably within an inch or two of its original

[1] *Op. cit.* p. 131.

FIG. 1. Plan of Stonehenge.




FIG. 2. View of the entrance, from Lockyer's observation point, stone no. 55 being omitted.

position, another guess must be made about no. 55. No. 56 was set upright after Lockyer's investigations had been made, but before his book on Stonehenge was written. By comparison with the two perfect trilithons (nos. 51–52, and 53–54) and by measurement of the mortice holes of the fallen lintel, he considered that his avenue axis or line of sight passed 11 inches from the south-west side of no. 56. Mr Stone has made a careful examination of this matter and concludes that the distance between no. 55 and no. 56 was not less than 2 ft. 6 ins., and taking the mean, suggests that the axis passes 18 ins. to the right of no. 56, with a possible error of plus or minus 3 ins. Prof. Sir W. M. Flinders Petrie estimated that the distance between nos. 55 and 56 was only 12 ins.

An examination of the two complete trilithons shows that they are considerably weathered, and the mean distance between the uprights nos. 53 and 54 at 5 ft. 8 ins. from the ground (the height of the eye), is about 15 ins., and between nos. 51 and 52 about 10 ins. For this reason, Lockyer's suggestion of 11 ins. (that is, half a distance between the stones of 22 ins.) seems to be preferable to Mr Stone's estimate of 18 ins.; but this is no great matter. As a fore-sight, the business parts of the stones are at eye level. Where is our eye level? This depends on the spot from which the astronomical observations are to be made. The centre of the circle will not do, we cannot aim from between the sights. Lockyer's station is not very conveniently described as " at a distance of 61 ft. to the south-west of the centre of the temple." (He assumed that it was a temple for sun-worship). I find this to be about 33 ft. 8 ins. from the south-west face of the great stone no. 56, or 7 ft. beyond no. 16, a solitary survivor in this direction of the stones of the outer circle. Standing here, with an eye-height of 5 ft. 8 ins., and looking through the entrance, the ground line of the houses which may be taken as the sky-line horizon formed by Lark Hill crosses the stones nos. 30 and 1 at about 6 ft. 1 in. above ground level, and at this height a measuring rod 5 ft. 2 ins. long can be sprung in between them, but owing to irregularities their effective distance apart is 5 ft. It may be significant that they are fairly plumb in their upper half, but have considerable batter or taper in the lower half. The great stone no. 56 is to all intents and purposes plumb on its south-east side.

Lockyer, having ignored the stones, was at great pains to define his axis along the direction of the avenue. He uses the term azimuth. This is an astronomical expression having exactly the same meaning

as a surveyor's or a sailor's " bearing." Azimuth is measured as so many degrees, minutes and seconds from some zero standard bearing. For example, so many degrees east of north. If north is 0 degrees, then north-east is N. 45 E., that is, the azimuth is 45 degrees east of north. A magnetic compass corrected for the regular annual variation (about 16 degrees west at present), and for any local variation, is generally sufficient for the sailor, but it is not nearly accurate enough for the present purpose. To fix the direction, Lockyer took observations of the North Star and the sun, making, of course the proper corrections. He took also the azimuth or bearing of the spire of Salisbury Cathedral with a theodolite, and found this to be 9 degrees 8 minutes of angle east of south. The object of observing the spire was to enable him to use the Ordnance map as a check. The spire can be seen from Stonehenge on a clear day and by keen sight, or with a field glass. The mean of the two directions of the avenue gave an azimuth of N. 49 deg. 35min. 51 sec. E. Plotting this on a map he found it passed close to the top of Sidbury Hill, which is not visible from Stonehenge. He adopted this Sidbury Hill azimuth N. 49 deg. 34 min. 18 sec. E. as his final axis. Lockyer considered that this difference in azimuth was negligible, and Sidbury Hill could easily be referred to on a map. A sailor would say that the bearing was between N.E. and N.E. by E., or about $4\frac{1}{2}$ points east of north. So far for his axis or line of sight.

The next thing was to observe the sunrise. This was done on the morning of 25 June 1901, by Mr Howard Payn, after four unsuccessful mornings. The sunrise point is so nearly stationary at this time of year that the difference (owing to being four days late) is negligible. Some fixed point had to be chosen on the horizon, for the pegs set out along the avenue would not be visible from the observing point. The tip of the Heel stone most conveniently lent itself for the purpose (A, fig. 2).

It might be said that the process of sunrise is not complete until the whole of the sun can be seen. From an astronomical point of view, the moment of sunrise is when the disc of the sun is cut in half by the true horizon ; and again, the moment of sunrise may be said to be that at which the first gleam appears. Practically, Mr Payn allowed enough of the sun to rise to enable him to measure the exact middle of it with his theodolite. It was 2 minutes of angle or about one-sixteenth of its diameter above the skyline of Lark Hill. (B, fig. 2). The angular distance was found to be 8 min. 40 sec. north of the tip of the Heel stone, or an azimuth of N. 50 deg. 30 min. 54 sec. E. This is 56 min.

36 sec. east of Lockyer's axis, and on this difference his theory of the date of the building of Stonehenge is founded.

As such angular measurements may be unfamiliar to many of my readers, I have made a sketch of the entrance. As seen from Lockyer's observation point, the view is confused by the presence of the fallen no. 55 in the foreground. But by a little study of the subject a sketch can be made as though the fallen stone had been removed. The skyline is now covered with military buildings. Three scales are shown, one of feet, beginning from the right, another of angles of azimuth counting from the north, and the third is a scale of dates in thousands of years. The scale of azimuths gives the angles as seen from Lockyer's observation point, and the scale of dates is calculated from this. On the skyline horizon the middle point (C), is marked. The two directions of the avenue observed by Lockyer are bracketted together ; the mean of these is 8 min. 32 sec. north of the middle point. On 26 June 1901, the sun rose close to the Heel stone, as shown, the part below the skyline being dotted. The true horizon is shown by a dotted line. Mr Stone has a somewhat similar diagram, but I differ with him slightly in his deductions from Lockyer's data.

The whole gist of Lockyer's theory is that a long time ago the sun rose at a point in the direction of the avenue, but it does not rise in that direction now. From astronomical knowledge he calculated that the sun rose at this point in 1680 B.C., with an allowance of error of 200 years earlier or later.

Now let us consider some of the astronomical facts on which he based his calculations. I have not found, or expected to find, nor am I indeed competent to find any error in them, and in discussing them I have received great help from an astronomical friend. The earth travels in an ellipse, very nearly a circle, round the sun once in a year. Hold a pencil in the usual slanting position, and move your hand round as though you were drawing a large circle, *widdershins*, or against the hands of a clock. The top of the pencil will point over your shoulder, and will keep pointing in the same direction while your hand moves round. The axis of the earth, in the same way, keeps a slanting position as it goes round the sun, and the north pole points to a part of the sky near the North Star. The axis of the earth is inclined at an angle of about 23½ degrees from the upright position.

Imagine that you spike an orange on your pencil, and have a candle in the middle of your circle. Half of the orange will be in shadow. While you are moving it away from you on the right hand side of the

circle, or when you are moving it towards you on the left hand side, the pencil will be on the edge of the shadow. When the earth is in one of these positions as it moves round the sun, and as it daily turns on its axis, every point will pass through daylight and through night, and the duration of the day will be equal to the duration of the night. These are called the equinoxes, and occur at about 21 March and 23 September, and the sun rises at 6 a.m. and sets at 6 p.m. But while you are moving the pencil sideways, on the part of the circle nearest to you, the upper or north pole of the orange will be in shadow all the time. The middle point of this position is called the winter solstice. At the opposite side of the circle the north pole will always be in the light ; that is the summer solstice. At the equator, sunrise and sunset are at about 6 o'clock all the year round, but at places on the northern hemisphere the daylight will be longer than the night, and the longest day is on about 21 June.

A little further study of this shows that, as most of us know already, at the equinoxes the sun rises and sets nearly due east and west. In the winter the sun is lower in the sky, its path is cut off at each end, and it rises more towards the south-east and sets toward the south-west. In summer the path is high in the sky and it rises and sets towards the north-east and north-west. The exact point at which it rises in its most northerly position is the only one which concerns us in connexion with Stonehenge.

If the earth had this simple motion, the sunrise points on any one day of the year would be the same year after year for ever. But the axis of the earth does not always point to the same place ; it slowly passes from point to point and describes a whole circle in 25,800 years. The North Star is now nearly two and a half moon-breadths away from the present pole in the sky, in a direction opposite to that of the last star but one in the tail of the Great Bear. Some 4,000 years ago a star between the tip of the Great Bear's tail and the North Star, served as a North Star, and in 12,000 years the bright star Vega which is now nearly overhead on a summer evening will be near the pole of the sky.

But besides this, the angle of slope of $23\frac{1}{2}$ degrees is not exactly fixed, and the angle is about half a degree less than it was 4,000 years ago. The rate at which this angle changes is known now, more exactly than it was in Lockyer's time, and the latest values according to Newcomb are given in Mr Stone's book. The connexion between this angle and the point of sunrise is a matter of rather difficult calculation, but it is easy to see that if the angle were nothing, if the earth's axis

were upright as it went round the sun, it would be equinox all the year round, and the sun would always rise in the east. The sloping makes the difference between summer and winter, and (this is the important point) the greater the slope, the more northerly will be the point of sunrise in summer. The result of Newcomb's values as given by Mr Stone is, that the date at which the sun rose in the direction of Lockyer's axis is 1840 B.C. instead of 1680 B.C.

Three possible moments of sunrise have been mentioned. What we are concerned with are the places of sunrise, the positions of the sun at the first flash, the half-risen sun, and the fully risen sun. In passing from one of these positions to another the sun moves along the path shown by the sloping dotted line. If the half-risen sun had been chosen, the date would have been about 3500 B.C. and the fully risen sun would have touched the skyline at Lockyer's axis in 5200 B.C. Antiquaries consider that 2000 B.C. is a reasonable date, and some competent authorities hold that the early works on the site may have dated from 3000 B.C. or earlier.[1]

Lockyer's assistant, Mr Howard Payn, found, as I have stated, the angle between the tip of the Heel stone and the sunrise point was 8 min. 40 sec. Mr Stone discusses the observations, and for some reason which is not clear to me gives (p. 129) the angle as 20 min. 19 sec. Lockyer states that his axis passes within a few inches of the middle line of the entrance, the deviation being northwards. This deviation worked out from his observations is 0 deg. 8 min. 32 sec. or 570 years.

As I have said, I agree with Mr Stone that the middle point of the entrance, between stones nos. 30 and 1, is the only one that can be taken for one point on the true axis of Stonehenge. But if you stand alongside the great stone no. 56 on Lockyer's axis, or anyone else's axis, and move your head 5 ins. to the right, and then 5 ins. to the left, you cause the middle point of the entrance to be displaced 10 ins., or one sun's breadth relatively to a point on the skyline, and this makes a difference of 2,000 years in the calculated date. You must settle which eye you are going to use, for the difference of position between your right eye and your left makes a difference of 500 years in the date. I do not think that Stonehenge is a very satisfactory astronomical instrument for the purpose of settling dates. If you go to Stonehenge with the midsummer morning crowd, and get a good place with your back to the end of the fallen no. 55, you will see (weather permitting),

[1] [The date, or dates, of Stonehenge cannot yet be determined with precision; but, in the opinion of some, 2000 B.C. is too early.—ED.]

the sun rise exactly over the Heel stone,—but then you are not on the axis of Stonehenge.

If no better reasons than the foregoing can be adduced to show that Stonehenge was a temple for sun-worship, could any other purpose have been served by its orientation to the sunrise point? Yes: it was perhaps the most simple way of fixing a date in the agricultural calendar. To investigate the capabilities of Stonehenge as a calendar it is necessary to consider the point from which observations might have been taken. Only one point presents itself, namely the centre of the circle. Let us trace the course of the sunrise point from 22 December when it is at its most southerly limit. (The calculation can be very easily made by using an Oxford Astrolabe, made of celluloid and card, designed after the Persian and other medieval instruments by Prof. F. C. Jenkin of The Engineering Laboratory, Parks Road, Oxford). The view of the mid-winter sunrise is cut off by stone no. 52 of the east trilithon. In the middle of March the sunrise point might have been observed between nos. 3 and 4; but the sunrise point is moving at its fastest rate. On 1 April it would have been seen between nos. 2 and 3 if not blocked by a blue stone, and in the middle of May sunrise might be seen between nos. 1 and 2. It is not worth while to trace the return autumn journey. There are two unhewn boulders and two mounds of earth placed at about 142 ft. from the centre. The sun would have risen over one of them on about 1 February, but the view from the centre would have been blocked by no. 52. Stonehenge was therefore useless for calendar purposes except to fix one date, namely the week (if that can be called a date) of midsummer time.

All this hair-splitting criticism may be applicable to the work of a careful and imaginative astronomer, but is it applicable to such a structure as Stonehenge? I think not. The purpose for which it was built and used still remains a matter of conjecture. Apparently it was never inhabited. It may have been a place of assembly. We may imagine great gatherings for religious ceremonies, or for the administration of justice, or for controversy, or government. It has been regarded as a temple or sacred place. These words originally meant an enclosure, and so far from being a place of assembly, the circle of Stonehenge and the surrounding ditch were, perhaps, to use an expression applicable to primitive religions, *tabu*, and the general public were excluded from them. The sepulchral character of other lesser stone circles has been established by the discovery in them of cists containing interments. Other suggestions are that it was a monument,

that it was a place of execution where defeated British leaders were hanged in honour of Woden, that it was a calendar in stone for the measurement of the solar year, and so on.

There is a widespread popular idea that on the morning of 21 June something happens at Stonehenge which occurs on no other day of the year, and on that morning the remarkable event is celebrated by chariots, instruments of music, and alcoholic libations, in the form of charabancs, gramophones and beer, to be found there before dawn, and a huge expectant crowd. The builders of Stonehenge may have marked the week, but they could hardly have known the day.

Some calendars tell us which is the shortest day, and one of the leading publishers of diaries has made a mistake about this. It would fall later and later every year did not Leap Year bring it back a whole day. At the end of a century, when Leap Year is omitted, the longest day skips forward from 20 June to 22 June. But the longest day is longer by only a few seconds than the previous or the following day, and this is a matter of rather tedious calculation.

Whitaker's almanack shows that at the latitude of Greenwich in June, the sun rises earlier and earlier until the day comes when it rises at 3.44 a.m. and continues to do so for about a week, and then it rises later. Of course this succession of exactly 44 minutes means that the seconds have been left out. Sunset time is also stationary for several days, and these begin when the fixed sunrise period is ending, because our " mean " time does not correspond with the solar time shown on a sun-dial except on four days in the year. It was impossible that the wise men in the days of the building of Stonehenge, though they knew a good deal of astronomy, could have known anything about this. What they could have done was to observe that the point of sunrise, making long hops in the east in spring, slows down, and creeps to nearly north-east. At last, an observer standing midway under the great trilithon would see it one morning rising close to the north side of the entrance, and its rising point would change less and less each day, and for a period of about three weeks the position of the sun on the horizon at sunrise would move only the width of the sun. The builders doubtless had some such knowledge or had made some such observations before the present arrangement of stones was planned. But to say that this was the purpose and object of Stonehenge seems extravagant. If " sights " to give the most northerly position of the sunrise point were needed, two stones, or two pairs of stones, or two hillocks of earth would have sufficed, and such " sights " are claimed

to have been found by Admiral Somerville at Donoughmore, co. Cork, and by Sir Norman Lockyer on Dartmoor.

Archæologists tell us that a considerable number of the primitive huts and long barrows are directed to the north-east, but there is no general orientation of stone circles or avenues in this fashion. Stonehenge as it stands is acknowledged to be one of the most elaborate and perhaps the latest structure of its kind. We find highly skilful dressing of the stones, and it must have been erected by very clever men, perhaps in the way so ably suggested by Mr Stone. No wonder then, that when they decided to plan so important a work, whether the present structure or some previous one of which we only have traces, and to plan it with reference to the midsummer sunrise, they carried this out carefully. No astronomical knowledge, no calculation, no mathematical instruments, no acquaintance with geometry or surveying was needed. Lockyer brought a theodolite with verniers and magnifiers capable of measuring the 360 degrees of a circle, the 60 minutes of each degree, and the 60 seconds of each minute, and large scale Ordnance maps, observations of the North Star, corrections for the level of the skyline, and for refraction and parallax, in order to make observations on which he might base his estimates of astronomical changes for dating the building. It may be asked :—What did the builders of Stonehenge know of such refinements, and what instruments did they use? There is a confusion here between the objects and intentions. It was indeed a compliment to them that all this was thought necessary. The old builders simply did the work by eye. It is astonishing to find what accurate work can be done by eye with a well-ploughed furrow, or lining up a long straight fence. He would have a rough eye who could not detect a misplacement of 3 ins. at the end of a gardener's line 57 ft. long. This is equivalent to a quarter of a degree. If we admit that the builders of Stonehenge could work with half of that error corresponding to a difference of 500 years in the date, what proof have we that they actually did so? There is a manifest probability, but to attempt to produce a proof of the date from the axis of Stonehenge is to argue in a circle.

It is easy to bring all sorts of theories and conjectures now that this grand and simple monument is there. We may prolong the axis to the north-east and find it hits Copenhagen ; or ten and a half miles to the south-west to the village in which I live; and then down to the coast, passing a little to the right of the megaliths of Carnac, and out to sea to the district where the lost Atlantis may have flourished. And we may prolong controversies about it until we fill a library.

# Some Prehistoric Ways

by R. C. C. Clay, F.S.A.

In Palæolithic times when each family was self-contained, before social laws and customs had bound such units together to form tribes and clans, the hunters, for such they all were, followed their quarry through the forests and along the valleys, keeping to no set trackways. They needed none, for trackways imply thoroughfares to and from fixed sites or habitations—and the Palæolithic hunter was a nomad.

When the amalgamation of families took place in early Neolithic or Epipalæolithic times, no doubt the marsh-dwellers had recognized paths across the swamps to the mainland, and those who formed the shell-mounds of Ertebolle may have used beaten paths along the shore from estuary to estuary.

With the introduction of agriculture in later Neolithic days,[1] when the beaker and round-bottomed bowl were in daily use, man of necessity migrated to the more open country of the uplands. It is almost generally accepted that at this period animals were domesticated for the first time. Sheep, horses, cattle and probably pigs were bred and herded chiefly for the food their flesh produced, but to a certain extent (in the case of horses) for use as beasts of burden. Dogs were also trained to assist man in hunting. It is still an open question whether the engraved and sculptured heads of horses dating from the Solutrean and Magdalenian periods depict bridles. The horse's head from St. Michel d'Arudy undoubtedly has one. The agricultural and pastoral life of the late Neolithic peoples implies a more settled and peaceful existence, and no doubt there was inter-tribal communication and commerce. Recognized pathways would connect settlement with settlement, and along them would be carried flint from the nearest

[1] Mr A. Keiller has recently found at Windmill Hill, near Avebury, several saddle querns and grain rubbers associated with round-bottomed bowls. This appears to be the earliest proof of corn growing in Britain, but Kossina credits the Ertebolle peoples of Denmark with the cultivation of local grains (see Childe, *Dawn of European Civilization*, p. 16).

mine. These tracks would naturally follow along the crests of the hills, not only because the valleys were undrained marshes with dense thickets, but also because the habitations to which these tracks led were themselves on the high ground. These old green roads or ridgeways have not been in continuous use. Some at least in South Wiltshire fell into decay during the Early Iron Age. For example the ridgeway that stretches from Coombe Bisset to beyond Wingreen is crossed in many places by the Celtic lynchets and cattle-ways of that period. The parallel track to the north along the range of downs that reach from Salisbury to White Sheet Hill is likewise traversed by cattle-ways that have been proved by excavation to be contemporary with the village sites of Fifield Bavant[1] and Swallowcliffe Down.[2] Within late historic times this latter road has been metalled and used as a coachroad until supplanted in 1758 by the modern highway along the northern foot of the hills. This ridgeway then became the thoroughfare along which drovers took huge flocks and herds to the distant markets, and many a ridgeway still bears the name of The Oxdrove.[3] But now, thanks to railways and motor lorries, the old green road has once more lost its importance in the eyes of the world, and is used only by gipsies and archæologists. The author of *Early British Trackways*, who despises "antiquarians," would have us believe that such ridgeways were planned by some prehistoric surveyor who sighted a straight line between some church (centuries before it was built) and some round barrow. Barrows, the author states, were primarily designed as sighting points and not as burial places. His argument that roads were made because the barrows were there is putting the cart before the horse. The merest amateur in archæology knows that barrows are grave mounds, and it is necessary in archæology, as in all other sciences, to have some slight knowledge of its fundamental principles before attempting to startle the world with new theories.

The dawn of the Early Iron Age synchronized with the full development of the preceding Age of Bronze, one of the most important epochs in the prehistory of this country. At that time there were repeated and perhaps continuous immigrations of peoples along the south coast, especially in Sussex and in the neighbourhood of

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[1] *Wilts. Arch. & Nat. Hist. Mag.*, xlii, 457.

[2] *Ibid.* xliii, 59.

[3] The great sheep fairs at Yarnbury Castle, Weyhill and Tan Hill may owe their origin to their position on the junctions of such roads.

Christchurch and Weymouth;[1] the introducers of the leaf-shaped sword complex, the invaders who brought over the culture of Hallstatt, the importers of the Celtic scroll, the Belgae. Such settlers moved inland by means of peaceful penetration and hence the need of thoroughfares with a general direction of north to south. Roads of this kind would cross the prevailing east to west ranges of the south and may be termed Lateral Ways, for they linked up range to range by crossing the valleys and for the most part took a direction at right angles to the former ridgeways, although at times they themselves joined and were incorporated in the latter. These lateral ways were not new products of the period, but were old tracks through natural passes in the hills, pre-existing fords and former clearings in the wooded valleys, that were developed and came once more into more general use. If all the localized "flint sites" or camping grounds of flint using peoples in an area such as the south-western corner of Wiltshire are mapped, it will be noticed that they appear to be situated close to natural passes in the hills or opposite river crossings, and that they lie alongside tracks which, though now disused in some instances, are mentioned as lanes in the Anglo-Saxon charters and were therefore recognized thoroughfares. Moreover it will be seen that these ways, if traced for several miles, link up chains of camps. As an illustration of this the following section of road may be cited. If we start at Knighton Wood and travel northwards down the road that runs along Church Bottom we pass on the east the square earthwork called Wuduburh[2] in the Saxon charters and proved by excavation to be of Early Iron Age date.[3] Crossing the River Ebble at the position of the modern bridge, the road went slightly north-westwards and up the western edge of the coombe that leads to Chiselbury Camp (Early Iron Age undoubtedly; but that, as Kipling says, is another story). The road can then be traced to the east of Chiselbury into Sigwine's Dyke[4] (sunken road), then along the foot of the hill for a short distance to reach the Green Drove, and so through the pass called Sandy Hollow over the edge of the high greensand terrace and down to Catherine's Ford over the River Nadder. The road then goes due north over the opposite greensand ridge by another Sandy Hollow with Wick Ball Camp[5] on the west and past

[1] *Antiq. Jour.*, ii, 27 and *W. A. & N. H. M.*, xliii, 313.
[2] *Arch. Jour.* (1920), xxvii, 27.
[3] To be published shortly in *Wessex from the Air*.
[4] *Arch. Jour.* (1919), xxvi, 193.
[5] Very similar in design to Chiselbury.

Dinton Beeches with Hanging Langford Camp[1] (Early Iron Age) and Bilbury Rings on the east, over the River Wylye by the ford at Deptford and so past Yarnbury Castle[2] (certainly Early Iron Age) past Stonehenge and Vespasian's Camp to Beacon Hill. It then divides, one branch being continued on as the Harroway through Weyhill and Hurstbourne to Farnham, the other turning south-eastwards past Quarley, Danebury[3] and Woolbury Camps to Winchester and so along the south downs of Sussex. This road with its branches from the River Wylye has been traced by Dr Williams Freeman.[4]

Before describing double-lynchet Ways it would be as well to define and, as far as possible, explain the mode of formation, or rather the growth of a lynchet. Lynchets are banks seen on the crests and slopes of hills, especially in chalk districts, which are arranged in a more or less regular pattern and which represent the boundaries of ancient cultivated areas. Before the work of Curwen,[5] Crawford,[6] and Toms[7] there was very little definite knowledge on the subject of lynchets, and many of the guesses as to their purpose were not only incorrect but fatuous. It can now be accepted as an established fact that the area enclosed by lynchets was once ploughed ground, and that the natural slope of the land has been altered by that ploughing. In order to understand better the nomenclature applied to the different varieties of lynchets to be described later the method by which these areas were cultivated must be touched on now. Undoubtedly the one-way plough was employed, and furrows were driven always along and never up the slope of the ground. By the one-way plough we imply a plough with one share, probably of wood, that was driven along the slope for a distance corresponding to the length of a lynchet and then brought back empty and the process repeated. In other words ploughing was done in only one direction. It may be argued that prehistoric man would not be so stupid as to waste time in bringing back his empty plough, since the slope in the reverse direction would be as easy as in the outward.

[1] Mr Newall's excavations have proved this site to date from La Tène III.

[2] Just after the war I examined a portion of the rampart on the north side that had been damaged by a bomb and in the material forming the rampart found a large piece of pottery that is unquestionably Early Iron Age in date.

[3] Crawford. *Observer*, 4 Oct. 1925.

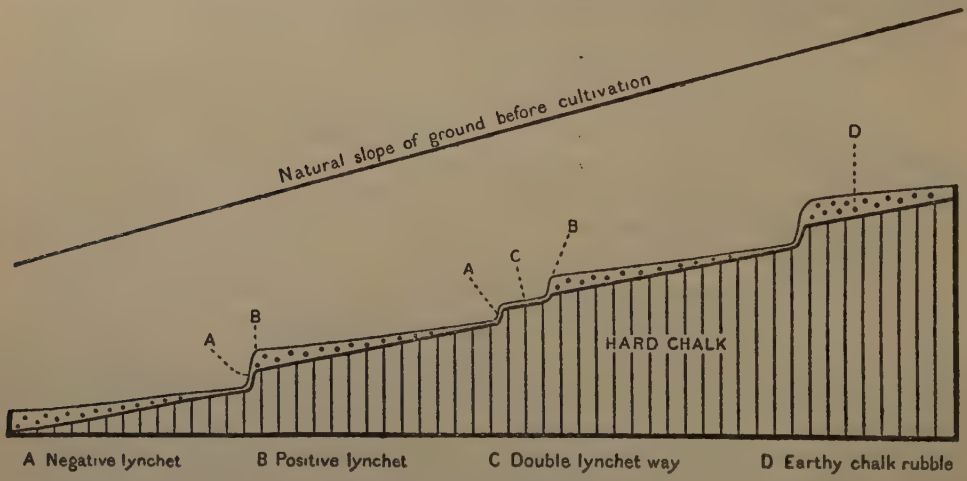
[4] Williams Freeman. *Field Archæology* (map at end of book).

[5] Curwen. *Sussex Arch. Coll. lxiv*; also Williamson. *Brighton & Hove Arch. ii*, p. 55.

[6] *Geographical Jour.*, lxi, 342.

[7] *The Antiquary*, Nov. 1911; also *Procs. Dorset N. H. & A. Field Club*, 1925.

The answer to this is that prehistoric man did plough in one direction only and that he had a very good reason for so doing. It has already been stated that lynchets are seen on the crests and slopes of hills, and it is readily understood that at the time when these lynchets were formed, the uplands were the only suitable districts for cultivation. The valleys were undrained and consequently consisted of vast marshes interspersed with shallow pools and covered with dense vegetation. Again it is an accepted fact that prehistoric settlements with few exceptions were situated on the hills, and it is only reasonable to suppose that the inhabitants of these settlements had their cornland as close to their homes as could conveniently be. The land they cultivated was naturally sloping, and as such was unsuitable for corn growing in wet weather—we know that the climate was damper in those times—they invented the method of one-way ploughing in order to flatten the slope.




Forty years ago a farmer employed the same method to level a prehistoric vallum on Salisbury Plain. It will be seen that by ploughing in only one direction the result is that an amount of soil equal to the amount of soil in one furrow is transported from the upper side of the area ploughed to the lower. In other words the lower edge gains a furrow of soil each time it is cultivated and the upper loses it—the middle of the area changing in proportion. Thus the area tends to become less inclined, and if the ploughing was continued long enough would become quite horizontal. Turf is a great check to silting, but once the ground is cultivated there is during the season a perceptible

amount of spreading of the soil downhill. In the same way stones would gradually collect at the bottom of the fields. They would be picked up and placed at the edge. In process of time an area of ground having been marked out and ploughed by this method the lower edge of the field would become raised and the upper cut away like a step. The former has been termed a positive and the latter a negative lynchet by Dr Curwen. What actually happens is that where there is a lynchet system comprising many fields, negative lynchets lie directly under positive, and the whole slope looks like a flight of steps ; the tread of the steps corresponding to the cultivated area and the edge of the steps to the top of the positive lynchet. Lateral lynchets consist of the natural unploughed ground, and run up and down the slope of the hill. They are at right angles to the positive and negative lynchets. They constitute the boundaries between adjoining fields and are prominent for the reason that the soil on either side of them has been cultivated, and therefore has somewhat silted downhill, and because they are affected by the flattening of the area they enclose. The natural vegetation on them has been unchecked, and often stones have been picked off the fields and placed on them. This all tends to increase their prominence. In districts where sarsens abound, like the Marlborough downs, lynchets for these reasons have almost the appearance of stone walls. Crawford has distinguished two types of lynchets, the Celtic or chessboard, and the strip. These names explain their shape. Those of the chessboard type are usually on the crests and slopes of hills and are earlier than those of the strip type, which are commonly found at the foot of the slopes and are Saxon in date. In the same paper Crawford points out that the Saxons broke the tradition of hill-top habitation and settled in the valleys, and the natural desire to have farmlands as near as possible to the village is strong evidence in favour of the strip lynchets at the foot of slopes being Saxon in origin. Some at any rate were cultivated down to modern times. Usually the positive and negative lynchets at the ends of fields that adjoin one another laterally, and form a more or less horizontal row divided up into rectangles by lateral lynchets, appear to make a long unbroken bank. Sometimes however when viewed in an unfavourable light so that the lateral lynchets are not seen, the system on a hillside takes the form of a group of parallel short banks placed "en échelon." This is the case when the lynchets on the western slopes of Wylye Down[1] are viewed from the

[1] Wilts 6-inch O.S. 59 SW.

road that crosses Bapton Down. These short banks represent the positive and negative lynchets of a chess-board type of system, the lateral lynchets of which are shown up only by an unobscured setting sun. The reason that the vertical rows of fields do not exactly correspond with one another is that cultivation was begun on the west side of the winding road on top of the slope and proceeded downwards to the west, and that consequently the vertical are unequal in length.

Double-lynchet Ways[1] are roads that lead either straight or with right-angled turns through the middle of systems of lynchets of the Celtic or chessboard type. They are in fact farm roads through prehistoric ploughed land, and like all farm roads often lead to village settlements. Mr Wicks and Mr Stoney Smith have lately cut a section through a Celtic field-way on Charmy Down, near Bath, and found deeply worn wheel ruts. The surface of a double-lynchet way is the original natural down, while it is delimited on one side by a negative lynchet and on the other or upper side by a positive lynchet. The position of the double-lynchet way in respect to the old cultivated fields determines the character of its edges, so that occasionally when it passes the positive lynchets at right angles, it is delimited by the banks that form the lateral boundaries of the fields. The age of these ways is the age of the Celtic field system which may be anything between the late Bronze Age and the end of the Roman occupation. The question may be asked " Do any of these lynchets date from the late Neolithic period when corn growing was first introduced into England ?" The answer is in the negative. In certain localities rough examples of flint picks of the Thames and Spiennes types are relatively common. There is every reason to believe that these implements were used as hoes for cultivating the ground. By cultivating is meant the loosening of the soil after the seed has been scattered over it, a method still employed by some primitive peoples. The only alteration in the natural slope of the ground due to this method would be a very slight flattening caused by the increased silting from soil that is not turf bound.

Hollow Ways or Sunken Roads[2] are commonly seen running up the chalk escarpments in a slanting direction and taking advantage of the easiest gradients. They lead sometimes to camps or inhabited sites on the crest; at other times they skirt the modern roads that connect

[1] Curwen, *Sussex Arch. Coll.*, lxiv.

[2] Curwen, *Brighton & Hove Arch.*, i, 36; also Williams Freeman, *Field Arch.*, p. 47.

valley to valley and possibly are Saxon in origin, for Mr Crawford has shown that none of the riverside villages of Wessex can be traced back further than Saxon times. Many hollow ways lead to former arable land on top of the downs—land that was brought under cultivation during the Napoleonic wars when farming was at a premium. They are not so deeply worn as the prehistoric hollow ways for the reason that they were used for only a limited period. At times hollow ways bear a superficial resemblance to cattle ways (to be described later) when they are bounded by slight banks. These banks however are composed of the soft mud shovelled up from the surface of the road, and are related to the upkeep and not to the construction of the road. Besides, hollow ways lead in a slanting direction along the easiest gradient, whereas cattle ways run directly over the crest of a hill from valley to valley.

Cattle Ways are earthworks consisting of a ditch between two banks that usually run a perfectly straight course and connect the heads of two coombs by passing over the dividing ridge of down. To such structures Sir Richard Colt-Hoare has given the name of " Covered Ways,"[1] and in spite of Dr Eliot Curwen's detailed and exhaustive paper on them,[2] there is still room for further investigation into the subject and for fresh theories as to their purpose. From an examination of the south-west corner of Wiltshire the following facts are brought to light. These ways are grouped within certain areas which are closely connected with Early Iron Age habitations and are not related with Romano-British villages.[3] In these areas the number of cattle ways coincides with the number of opposing coombes that can be connected up ; thus they are found close together where there are numerous coombes and widely separated where coombes are scanty. The extent of an area is roughly four miles, the width of an area being the width of the downland. In any one area the width of the ways from crest to crest of banks is more or less constant, but the average of any one area may differ from that of another. The areas of down over

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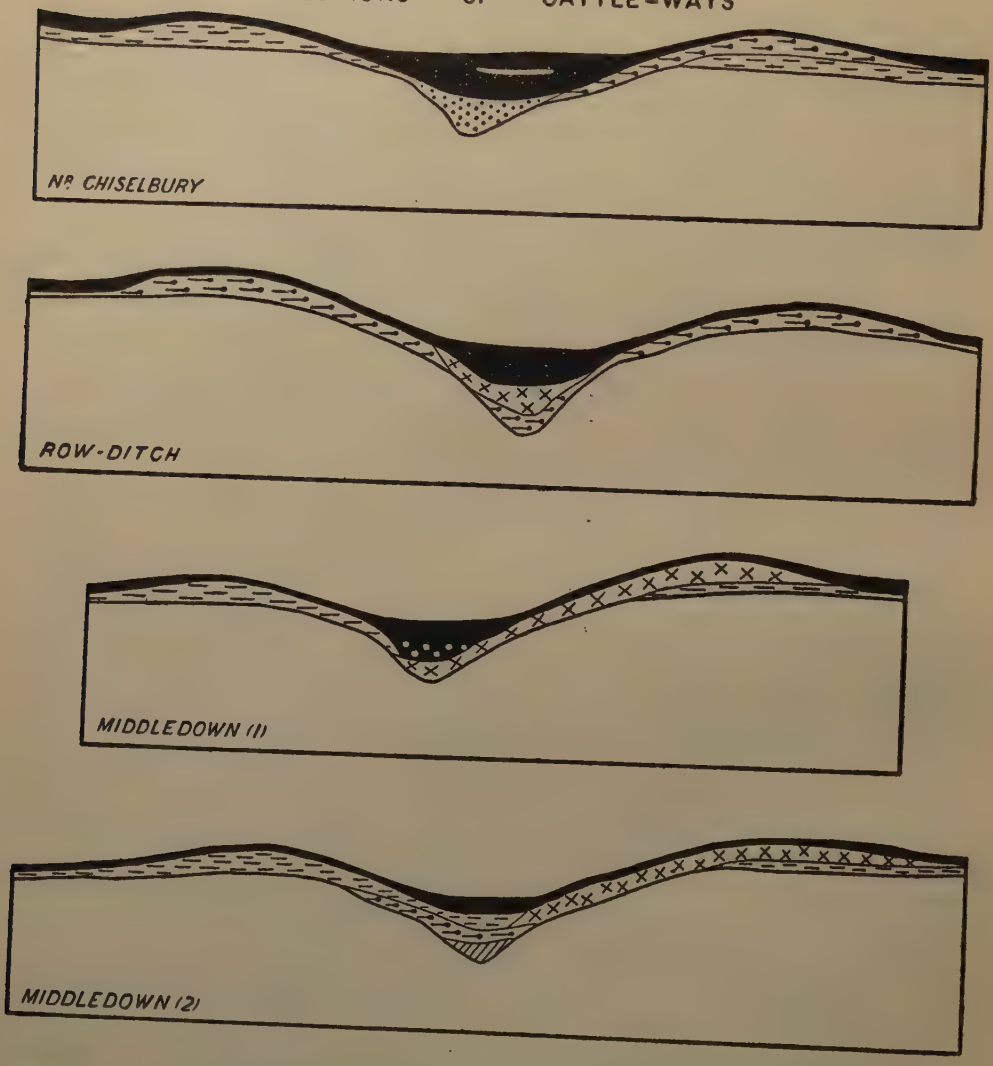
[1] *Ancient Wilts.*, South, p. 244.

[2] Curwen, *Sussex Arch. Coll.*, lix. See also Warne, *Ancient Dorset*, p. 25. Philips, *The Rivers, Mountains and Sea Coast of Yorks.*, p. 215. Pitt Rivers, *Brit. Assoc. Report*, 1881, p. 690. Greenwell, *British Barrows*, p. iii. Guest, *Origines Celticæ*, ii, p. 200. Cole, *Yorks. Geol. & Polytechnic Soc. Proc.*, 1888, p. 45. Mortimer, *Forty Years' Researches*, p. 379. Kitson Clark, *Proc. Soc. Antiq. Lond.* xxiii, p. 309. *Wilts A. and N.H.M.*, xxxviii, p. 69.

[3] For example see Wilts 6-inch O.S. 69, NE, SE, and NW.

SECTIONS OF CATTLE-WAYS



which these ways run bear surface indications that they were formerly covered by ploughlands divided up into rectangles of the Celtic or chessboard type by lynchets. These lynchets, it is also noticed, are contemporary with or later than the ways, for they run up to and end at the ramparts which are often transformed into either positive or negative lynchets.

Sections have been cut across four separate ways in an area around the Early Iron Age villages of Fifield Bavant and Swallowcliffe Down. These ways are so similar in plan and dimensions that it may be suggested that they were marked out by the same person. They all cross the ridgeway, a fact verified not only by direct observation but by aerial photography and by sounding with a heavy rammer. The cattle way running north-west and south-east across the ridgeway, 200 yards south-west of the Swallowcliffe Down village, was investigated and a section cut through it about 50 yards south of the ridgeway. There were vestiges of a lynchet system on the west side, modifying the structure and shape of the corresponding bank. The material of this bank was composed of earthy rubble with a great quantity of flints but little chalk, while the other consisted almost entirely of chalky rubble with little or no earth or flints. This indicates that the builders of the way constructed the former bank first from the top soil removed from the area intended for the ditch, and then went back to where they had started, deepened the trench and threw out the chalk they reached to form the eastern bank. The explanation is that it is easier to work up hill when digging a trench, and to shovel out the loosened soil to the left provided that the workman is right-handed. It can be presumed that these shovels were of the type commonly used in the Early Iron Age and made of the shoulder blades of oxen with the spines cut down. Dr Eliot C. Curwen has lately published an exhaustive paper on these objects.[1] In the section the hard chalk was found to slope away from under the crest of the ramparts on either side, and then to fall steeply to form a narrow flat-bottomed trench about one foot in width. This floor was covered by a thin layer of very compact chalky rubble, surmounted by a stratum of flints trodden down so hard that great difficulty was experienced in excavating it. Above this the filling of the ditch was comparatively loose. A fragment of pottery undoubtedly Early Iron Age in date was discovered lying upon the trodden flint bed. Beneath the northern bank were

[1] *Sussex Arch. Coll.*, lxvii, 138–45.

many calcined flints and fragments of sandstone, inferring the proximity of a habitation site. The mould over the trench was very deep, free from flints and chalk and slightly marly ; and it is interesting to note that the grave of the primary Saxon barrow near by[1] was filled with mould of a similar nature which must have come from above the cattle way. Thus the conclusion can be drawn that the latter is Early Iron Age in date and was constructed at a time when the Swallowcliffe Down village was extant.

Many suggestions have been made as to the purpose of these structures, and Dr Curwen has refuted most of them. They were certainly not defensive, for the alpha and omega of prehistoric defence was to be above your enemy and not to stand at the bottom of a narrow ditch ; besides, the making of two banks is a smaller obstacle to your enemy than one high one. Neither were they boundaries of tribal areas, for in places they were too close together. The presence of the hard trodden floors indicates that they were used as thoroughfares for men or cattle—probably the latter as their pointed hoofs would have been more likely to have caused the puddled condition. If they had been covered ways leading down to water supplies or wooded cover they would have run up to the prehistoric village with which we know they were contemporary. The writer's theory is that they were cattle ways along which Celtic men drove their herds in single file from grazing ground to grazing ground without the danger of the animals running over and damaging the crops that grew in the fields covering the high land. At the present day farmers erect a light fence on either side of the path between their cornfields before they drive their cows into that portion of their arable land which they have sown down to rotation grass of one or two years' "lay." The walls of the ditches of these cattle ways are so steep that cattle could not clamber up them, and the fact that they are so narrow is an advantage, for not only does it prevent an animal from turning round and walking back, but it also necessitates the animal's looking forward, and anyone who has had experience with cattle knows that they seldom stop and block the road unless they first turn across the direction in which they are being driven. The fact that these ways begin a few yards beyond the edge of the lynchet fields would facilitate the driving of cattle into them, all that was required would be the presence of a boy on either side of the entry. Cattle soon accustom themselves to a certain path

[1] *W. A. & N. H. M.*, xliii, 435.

and are in the habit of following in each others footsteps. They will also, if driven, travel directly up a steep incline and not, like human beings, follow the easiest slope.

The following species of Mollusca have been identified by Mr A. S. Kennard, A.L.S. and Mr B. B. Woodward, F.L.S. from material taken from the lowest level of the silting in the cattle way that runs into Chiselbury Camp :—

*Limax arborum* (Bouch. Chant.)
*Helicella nitidula* (Drap.)
*Helicella radiatula* (Alder.)
*Arion* sp.
*Fruticicola hispida* (Linn.)
*Xerophila itala* (Linn.)
*Vallonia excentrica* (Sterki.)
*Helix nemoralis* (Linn.)
*Cochlicopa lubrica* (Mull.)
*Pupilla muscorum* (Linn.)
*Vertigo pygmaea* (Drap.)

They state "This is a downland faunule, not of the arid type but indicating slightly damp conditions."

# Maori Hill-Forts

by Raymond Firth, m.a.

MANY a wanderer through the country districts of New Zealand has found interest in the sight of the monumental earthworks which crown so many of our hills. There is something grand and yet pathetic about these old fortresses. Once the scene of turmoil and activity, they now lie neglected and still beneath the sky, clothed in bush, or scrub, or fern, or grass-grown and dotted with sheep. Their day is over, the Maori long since has ceased to swarm on their slopes and man their palisades ; they are but a memory of the warring and the peacemaking, the fighting and the feasting of the eventful past.

In this paper it is my object to give a brief account of the general features of their construction and of their importance in Maori life.

There were in olden days several kinds of permanent settlement which a Maori community might occupy. The specific types need not be enumerated here ; suffice to say that they can all be comprised under two heads : *kainga*, or unfortified villages, and *pa*, or fortified villages. All Maori settlements of the present day belong to the class of *kainga*, but it is to the *pa maori*, the old native fort, that I wish to confine my remarks.

Before engaging in a detailed discussion of the different types of fortification with their variant features, it will be convenient to set down in a brief space the main characteristics of such a stronghold. It was built upon a hill or ridge, or was backed on one or more sides by a cliff, a stream, or the sea. The natural means of defence which this afforded was supplemented by massive earthworks, commonly in the form of vallum and fosse. The fosse alone, or the scarped terrace, was an accompaniment or a substitute according to local conditions. Several lines of defence were constructed, each being surmounted by a stockade in such manner that the defenders, stationed immediately behind it, were enabled actively to ward off any assault. In some parts fighting stages overtopped the stockade, and allowed the defenders more easily to cast down spears, rocks and other missiles upon the enemy beneath. In each line of fortification was a narrow gateway—

larger *pa* had subsidiary entrances as well—protected by a blind of palisading which exposed the foe to flank attack if he attempted to enter. Within the several lines of defence were dwelling-houses and storage huts for produce. The sections of the fort occupied by different family groups were often partitioned off, while behind the innermost fortification on the highest ground was the citadel of the stronghold, the site of the houses of the principal chief and his relatives, and the rallying point for all the people. Such is in essential the structure of the Maori hill-fort, though naturally local variants of all these points occur.

For comparative purposes it is interesting to note that the earthworks of the Maori stronghold are strongly reminiscent of the British hill fortress of the Stone, Bronze and Iron Ages. On the average, perhaps, the ramparts of these British forts, notably Eggardon and Maiden Castle, are of greater size than those of the Maori, and owing to the less rugged nature of the English countryside, they tend necessarily to be more elaborate. But to one who has spent many of his leisure summer days in roaming among the ditches, terraces and ramparts of the *pa maori*, the aspect of the British earthworks is by no means strange.

The function of these fortresses was apparently the same—to protect their inhabitants from external danger and to serve as dwelling places in normal life. In view of this fact their structural resemblance is noteworthy, raised as they were by the hands of people who are separated so widely by geographical situation, by cultural achievement, and by the span of the long-dead centuries. One needs to postulate no racial affinity nor far-flung cultural contact between the builders of these earthworks ; the evidence warrants no such wild hypothesis of antipodal linkage. But to the British archæologist the description of a functionally cognate type of earthwork fortification may prove of interest, especially as the type of evanescent detail which has not been preserved for him in this country is still a matter of knowledge in New Zealand. The tools employed in fosse-digging, the structure of wooden stockades, the use of terraces, the relation of defence to water supply —on these and other points the description of Maori practice can perhaps initiate a fruitful comparison.

The *pa* or fortified village was by no means the characteristic form of settlement throughout New Zealand. As a culture trait of any importance it is to be found almost solely in the North Island, a very few examples occurring south of Cook Strait. Moreover, in its most developed form of hill-fort with earthworks, with which we are here

concerned, it is very largely confined to the more northerly districts of this Island. Wellington, Hawkes Bay, Napier, do not display many examples, whereas in Taranaki, the Bay of Plenty, the Lower Waikato and the Auckland peninsula they seem to crown almost every prominent hill-top within sight.

It is possible that the distribution of *pa* in New Zealand is indicative of some specific cultural influence, but the evidence at present is far too faint to support any theory. Moreover the prominence of the hill fortress in certain parts of the country cannot be attributed solely to the more warlike character of the inhabitants. The suitability of the soil for entrenching, its fertility as a source of crops (which greatly influences the population, also the desire for the land), the topography of the district, including the character of the vegetation, were important factors in determining the type of defensive warfare to be adopted.

It should be mentioned that these hill-forts vary greatly in age, some having been constructed only a few generations ago, while others have stood for several centuries.

The actual structural features of the *pa maori* may now be considered.

From the point of view of defence the situation of a fortified village is of extreme importance. Sloping ground, even if only of gentle gradient, confers a great advantage both in the construction of defensive works and the repelling of an assault.[1]

The Maori was by no means deficient in a knowledge of the principles of fortification, so that rarely if ever did he attempt to construct his *pa* on open land, if an alternative site of any promise was available. Hill-top, cliff, headland, island or jutting crag—all of these were utilized by the native as sites for his defended villages, and some forts were rendered well-nigh impregnable from the outset by the judicious choice of an isolated precipitous rock pinnacle. Further vantage points of a similar kind were presented by the rugged western sea coast, from Taranaki northwards, and along the Auckland peninsula. A water-girded fort was always to be sought after, since it allowed of attack only by canoes or by swimming, hence islands, especially in lakes, were very popular as *pa* sites. In some cases so urgent was the desire for defence of this type that artificial islets were constructed with

[1] See the excellent discussion of this point in Hadrian Allcroft, *Earthwork of England*, 1908, pp. 162–7.

arduous labour, built up from the bed of the lake, and fortified with stockades. A particularly striking instance is the artificial islet Papawharangi, in the beautiful little lake of Papaitonga. This place was made by driving posts in a shallow of the lake, and sinking between them huge flax mats weighted with stones. Baskets of earth and piles of bracken were then heaped on top, together with other debris, more mats and stones were deposited above and the layer process continued until a substantial mound was raised.

At the present time the islet measures perhaps a score yards in diameter and stands about three feet above the water's edge.

In choosing the site of his *pa*, the Maori was an adept at seizing the advantage of the ground, and when building he was quick to utilize the natural barriers and incorporate them into the scheme of defence.

In a fortress with any pretensions to strength the primary place in the artificial defence system was usually held by earthworks.

These varied in character in different districts, and were adapted to the conformation of the site. Thus, for a headland, a ridge, or a spur, or on a gentle slope entrenchments were the rule, whereas on a rounded hill of steeper gradient such as the volcanic cones of the Tamaki isthmus, scarp and terrace were much in vogue. The most common type of fortification would seem to be the vallum and fosse, which characterized most of the forts of Taranaki, the Bay of Plenty, and the Waikato, and also occur in other localities. It is of interest to note that this was also the predominant type of defensive earthwork employed in the early fortresses of England. The Maori fosse was roughly rectangular or trapezoidal in cross section, the batters were fairly steep and often smoothed off to offer the minimum of foothold. In some cases the firmness of outline has been preserved, but nowadays the sides and edges of most of the old fosses have been broken down by erosion, tree roots, or the trampling of stock. As a general rule the material dug out of the fosse was piled up on the inner side to form the rampart. In this work some type of binding stuff was generally used ; brushwood of *manuka* scrub or the tops of bracken were the favourite materials.[1]

The rampart was made broad enough for the defenders of the *pa* to stand upon it and wield their long thrusting weapons ; it was essentially a structure to serve as an obstacle to assault, and to give the

[1] Best, *The Maori*, II, p. 321 ; S. Percy Smith, *Maori Wars of the Nineteenth Century*, 1910, p. 364.

occupants vantage of height and position, not to provide them with shelter from missiles.

Typical dimensions of a few of these earthworks may be given here to illustrate the range of achievement attained by these workmen of old with their primitive tools. A little fort examined by me some years ago at Tamahere in a bend of the Waikato river was defended by a single vallum and fosse, presenting in their eroded state a combined face of some 12 feet in height ; a similar small defended position jutting out from the heights above Muriwai beach was fortified by a single wall some 9 feet high and 3 feet broad on the top. These are but small fighting posts, and represent comparatively insignificant examples of the Maori art of fortification. In the larger *pa* the ditch and rampart were often of great size. The accounts given of native forts by some of the earlier visitors to New Zealand are of especial interest in this connexion, since they saw these structures complete and often actually in use. Thus Cook mentions that the ditch and rampart of one *pa* at Mercury Bay presented a wall 22 feet high, while the inner vallum and fosse of another fort occupied by people at the same place gave a total height of 24 feet, to which must be super-added the stockade, noted by Banks as being 10 feet high.[1]

If the fortified village was built on a ridge or a spur running off from a range of hills, then a rampart was often not constructed, but a simple fosse constituted the earthworks. This is the case with an ancient Maori fortress on the west coast of the Auckland peninsula. This *pa*, as Mr Geo. Graham has shown, ceased to be in permanent occupation after the middle of the eighteenth century, and so forms an excellent illustration of Maori fortification in pre-European times.[2]

The fortified portion of the village was built out on a spur overlooking the sea, which joins the main line of hills by a narrow ridge. The scheme of defence consists of three fosses transecting the ridge, the middle one being the main earthwork. The first fosse is 28 ft. long, 7 ft. deep, 18 ft. wide at the top and 7 ft. at the bottom. The second fosse, the principal line of defence, is a virtual gap cut in the saddle of the ridge. The outer face is not continuous from top to bottom, but is broken by a long step-like terrace 9 ft. down. This terrace, beginning with a breadth of 44 ft. and narrowing down

[1] J. Cook, *Account of a Voyage Round the World*, Hawkesworth, 1773, ii, pp. 340 and 342 ; Banks' *Journal*, ed. by Hooker, 1896, p. 199.

[2] *Journal Polynesian Society*, 1925, xxxiv, 19–23.

to about 16 ft., extends along for 52 ft., after which comes the second drop of 12 ft., to the bottom of the ditch. There one is confronted by the inner face, a sheer scarp 30 ft. high. The fosse is 16 ft. long, and as it falls away to a cliff at either end it can be seen what a formidable obstacle it was in olden days, when a palisade crowned the scarp and the defenders of the fort were massed above, ready to hurl down death on those who attempted to force the passage.[1] The labour needed to dig out this terrace and trench must have been very great ; at a rough calculation some 800 cubic yards of material have been scooped out from the ridge altogether. Further along the spur is another smaller trench, 32 ft. long, 12 ft. wide, and 10 ft. deep, which represents the innermost line of defence, but which appears of little moment in comparison with the large fosse. All these three ditches cut right across the ridge from cliff to cliff.

On the Tamaki isthmus and in the vicinity of Auckland the combined vallum and fosse was not the predominant type of fortification. The scoria cones of this district appear to have lent themselves to scarping, and so we find terrace after terrace rising to the crown of the hill, looking from a distance like the stairways to a temple of the giants. These old volcanic landmarks, with tier upon tier of grassy platforms, each pitted with the hut sites and storage pits of a century ago are a picturesque sight. And standing on the crest of any of the larger of these forts and scanning the countryside, one can see the slopes of half a score of others, each terraced and scarped from base to crown. Their numbers give evidence of the teeming population that once tilled the soil of the isthmus, that fertile soil for which tribe fought tribe till the narrow neck of land received the name of Tamaki-makau-rau—Tamaki of a Hundred Lovers.[2]

Details vary according to the particular fort studied, but on the larger hills such as Mangere, Maunga-rei (Mount Wellington), Maunga-whau (Mount Eden), and Ihumatao, the terraces are commonly 20 to 30 ft. wide, separated by a sloping bank or scarp of anything from 10 to 40 or 50 ft. in height. Sometimes the terraces completely encircle the hill, at others they are broken up into short stretches or platforms resembling the lynchets of English slopes. The scarping of these hills for fortification purposes has been somewhat complicated by the

[1] For a full account of this fort with plan and photographs see the writer's paper " The Korekore Pa," *Journal Polynesian Society*, 1925, xxxiv, 1–18.

[2] In recent years the valuable researches of Mr Geo. Graham have thrown much light on the history of the isthmus and its hill-forts.

fact that they are extinct volcanic cones, and in most cases the deep funnel-like depression of the original crater still remains in the centre. Consequently the site is robbed of a broad expanse at the top of the hill which might serve as housing space. This restriction of available space for dwellings on the crest of the hill to a comparatively narrow band encircling the crater partly accounts, I believe, for the labour taken to excavate such broad platforms. That these terraces were thickly occupied is proved by the innumerable house-sites which pit them, and by the presence in some parts of great numbers of hearth-stones, set on edge in the ground in the form of a rectangle to line the fireplaces of the former dwellings.

On volcanic hills where the lip of the crater has been broken through after the eruption a hollow or gully remains, and offers an easier ascent to the crest than up the main slope. The utility of this to potential attackers was perceived by the Maori and so he modified his defences accordingly. On Maunga-rei, Green Mountain, and other hill-forts near Auckland, one observes at such a spot not a continuity of terrace formation, but a series of short platforms or lynchets each 10 or 15 yards long and separated from its neighbour by a scarp of five or ten feet. These are so arranged that even should the foe make use of the easier gradient of the depression of the crater lip, he would not find himself within the line of palisades but would still have to face the cross stockades of numerous defended lynchets. A formed rampart is rare on these terraces, more often there is a slight slope of the terrace floor inward towards the centre of the hill. On the brink of each terrace a stockade was formerly set. The scarps of such terraces or ramparts were ascended by means of the usual Maori ladder, a single timber with notches cut therein; ditches were crossed by a rough draw-bridge constituted by a few planks.

On the use of stone in fortifications there is not much to be said, though it was sometimes adopted as a facing material for the scarp of terrace or fosse. Stone walls were sometimes built as at Te Tatua (Three Kings) or other places on the isthmus where the rocky surface favoured such a method.[1] Again on the smaller of the Poor Knights Islands (Tawhiti Rahi) stone walls occur, and my friend Mr R. A. Falla (to whom I am indebted for a description and photograph) is of the opinion that they were probably used as defensive works.[2]

[1] Geo. Graham, *Journal Polynesian Society*, 1921, xxx, 146.

[2] Terraced forts with the scarps faced with stone have also been described from Rapa-iti, in the Pacific, by S. and K. Routledge, *Jour. R.A.I.*, 1921, li, 454–5.

In connexion with the earthworks of the Maori *pa*, reference may be made to the technical apparatus employed in excavation. This point is perhaps of some interest in view of the opinions expressed by British archæologists as to the nature of the tools used in the construction of the hill-forts of this country.

The tools of the Maori were simple but effective. In the work of excavation and removal of soil three processes must be undertaken ; the loosening of the earth, the gathering of it together, and the carrying of it away, and the Maori had a type of implement corresponding to each of these purposes. Elsdon Best, than whom none has a greater knowledge of the native, gives a short description of these tools,[1] on which the following remarks are based. For loosening the earth the principal tool was the *ko*, the narrow-bladed, long-handled digging stick utilized in cultivating the soil for crops. A foot rest was lashed on the front of the shaft of the tool about 18 ins. from the point, and the foot pressed sideways on it, to give the weight in digging. In working at a *pa* a short form of the implement was also employed. For loosening earth once the sod was removed a paddle-shaped tool about $2\frac{1}{2}$ ft. long was used ; while for collecting together and clearing the loose soil from the trench a spade-like tool was used, or a form of shovel, having a rectangular blade with a rim at the sides. Two examples of shovelling implements, rimless, are in the British Museum, the one with a rectangular, the other with an almost semi-circular blade. Another type of implement also employed was scoop-shaped, somewhat like a canoe bailer. All these tools are of wood. When the earth had been scooped or shovelled up, it was put into baskets of native flax or wickerwork and taken up to form the rampart above the ditch. Such was the technique actually employed in excavation by the neolithic Maori of little more than a century ago.[2]

The massive earthworks of the Maori fortress were usually supplemented by less bulky structures of wood, which screened, crowned or

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[1] *The Maori*, II, 320–1.

[2] Allcroft, *op. cit.*, p. 167n. contrasts the skill in fortification of the Maori with their ignorance of other arts and crafts, and regards them as being a very primitive people. But material equipment alone should not be taken as the criterion of culture. In decorative art, music, poetry, the Maori had reached a high standard. It is quite incorrect to say of the Maori that " They were in fact, in the Palæolithic stage of culture." They were a neolithic people, well advanced in the arts of grinding, polishing, and drilling stone, even the *pounamu*, the green jade, which is known to modern lapidaries for its hardness.

overlooked them as the case might be. These were of two general types :—stockades and fighting stages.

The stockade had many uses. It was erected on the top of a rampart, on the brink of a terrace or a cliff, on the outer face or counter-scarp of a ditch, or stood alone on open ground. The general form of the stockade was that of an upright fence. Strong posts, even trunks of trees, two feet in diameter, were set deep in the earth two or three yards apart, and to them horizontal rails of saplings or split timber were lashed. To these again the palisades or battens of split wood were fastened vertically at intervals of a few inches by vine lashings. A fort might be defended by stockades alone, without the use of ramparts, but a *pa* of the first rank was protected by ramparts, fosses, stockades, and fighting stages. According to the principles of Maori military engineering, such a place of importance might be expected to have four lines of stockades, each having its proper name and function. The outermost was a comparatively light structure, after the nature of an elevated screen; the supporting posts were of no great size, the battens were lashed to the horizontal rails but were not inserted in the ground. A gap of about a foot was left at the bottom, to enable the defenders behind the second stockade to wield their long thrusting spears with freedom. The second line of stockade stood two or three feet back and was more strongly built. Three horizontal rails were used as a rule, and these were lashed to the inner side of the posts. The battens were then lashed to these on the inside again. Thus the structure was of great strength, and on any force being exerted to pull down the battens, the strain was taken by the massive supporting posts. The lashing was done with pliant stems of the tough *aka* (a climbing plant) usually with a cross tie.[1]

The third line of stockade in such a fort was the main one. For this the supporting posts were twenty feet or more in height, set five feet or so in the ground. The upper part of the post was cut as a knob, or carved in the form of a human head or grotesque figure of terrific aspect, with glaring eyes and lolling tongue. The main gateway, opening in this line of stockade, was often hewn from one mighty baulk of timber. Within this again was the fourth or innermost stockade, of somewhat lighter construction.

[1] The same material is employed to-day by the natives of certain forest districts, to lash their wooden fences. A native of Ruatahuna explained that the *aka* stems (of which several varieties are employed for different purposes) are cut some time before use, laid out in the open to dry and toughen and then steeped in cold water to render them supple.

Such are in native theory the stockade defences of a fully equipped fortress of the first rank.[1] In actual fact, however, many varieties of this type occur, and the adaptation of earthworks to the contour of the ground involves many modifications of the stockade scheme. A reference to the actual defensive works of a few typical *pa* of various kinds will indicate the variety of combination of earthwork and stockade employed, and the versatility of the Maori military engineer in turning to account the disposition of the ground.

On the terraced hill slopes of Maunga-rei, Matangi-nui, Raratonga—forts of the Tamaki—for instance, scarp and stockade alone were employed and a series of these, varying in number according to the size of the hill, constituted the defensive works of the stronghold. One of the *pa* referred to above, as being seen by Captain Cook at Mercury Bay in 1769, was situated on a headland, two sides of which were washed by the sea. The whole fort was enclosed by a stockade about ten feet high. On the landward side it was defended by a double ditch, the inner of which was backed by a rampart surmounted by this stockade. Another stockade was set on the outer brink of the ditch, so placed that it inclined inwards towards the fort. This somewhat unorthodox disposition of the stockade enabled defenders upon the ramparts to thrust down their spears without hindrance. The anonymous author of the *Journal of a Voyage Round the World* (pub. 1771), quotes a native chief to the same effect. This man explained that if the stockade pointed outwards, the enemy would find cover behind it, and could not be dislodged by the people in the *pa* (p. 99). The interior of the fort was rising ground, and a series of terraces had been formed therein, each enclosed within separate walls of palisading. These enclosures communicated with one another by narrow lanes which could be easily stopped up. The only entrance to the *pa* was by a narrow passage 12 ft. long, which passed under a fighting stage.[2]

In 1814 Nicholas entered a *pa* at Rangihoua, Bay of Islands, which he describes as being defended by a wide and deep fosse with a stockade of great strength on the inner side. Palisaded enclosures divided off the huts, and carved " stiles " (of the nature of notched post-ladders) were used as a means of entry to them.

The house of the chief, as was customary, occupied the highest

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[1] See the excellent description giving full native terminology by Best, *The Maori*, II, 321–31.

[2] Cook, *op. cit.*, p. 340. Banks, *op. cit.* 199.

part of the hill.[1] Another *pa* on the south side of the Bay was defended by a fosse and vallum and then a stockade. To render the place still more inaccessible a great part of the hillside had been cut away and the face made quite precipitous.[2] A stronger fort was that of Okuratope near Waimate, seen by Marsden and Nicholas in the same year. The first line of defence was a strong stockade of heavy posts 20 ft. high, the only entrance being a narrow opening 5 ft. high by 2 ft. wide. At a short distance from this came a "moat" at least 9 ft. broad, filled with water—an unusual mode of defence for the Maori—backed by a steep rampart on which stood another stockade of similar strength to the first. After an intermediate space of 80 ft. or so came a steep scarp about 15 ft. high, crowned by a third stockade that encircled the *pa* and completed the defensive works. This *pa* contained over 100 houses and store huts, and was occupied by 200 to 300 people.[3]

The Manu-korihi *pa* in Taranaki, surveyed in 1842, displayed a triple line of major earthworks with a subsidiary ditch covering them in front. On two sides the *pa* was protected by a cliff with the river flowing along part of its base, and here a stockade along the cliff edge sufficed. But on the open side came the earthworks, each of the three lines comprising a fosse, and behind it a rampart, crowned with a stockade.[4]

These few instances, drawn mainly from the accounts of early observers when the Maori *pa* in all its strength still constituted an integral feature in the life of the people, indicate the difference in the methods of fortification, and the varied manner in which stockades were utilized as defensive works.

Wooden erections of the other type were also used in many forts as a basis for defensive operations. They were the fighting stages, elevated platforms 20 ft. or more in height, set on massive posts to overtop rampart or stockade. Banks (*op. cit.*, p. 199) notes that one stage was 20½ ft. high, 6½ ft. broad, and 43 ft. long, while on it were laid bundles of spears and heaps of stones to be cast down for the discomfiture of the enemy beneath. These and similar stages were

[1] *Narrative of a Voyage to New Zealand*, 1817, i, 174.
[2] *Ibid.*, pp. 269–70.
[3] Nicholas, *op. cit.*, i, 336–7.
[4] A. Hamilton, *Maori Art*, 1896, p. 123 (plan).

NOTE.—Marsden, *Missionary Register*, Dec., 1816, pp. 502–3, says in his description that there were three rows of trenches. This discrepancy may be partly due to his having included the scarp in this category. But if his account is correct then the *pa* was defended still more strongly than represented above.

also used by the watchman or sentry who in troublous times was posted there to give warning of the approach of an enemy. On this stage often hung a *pahu*, a large wooden slab suspended by cords after the manner of a gong, which gave out a resonant booming sound when struck, and served to warn the inhabitants of the fort and of the nearby countryside.

A few words may now be devoted to a discussion of the value of the *pa* in warfare. The somewhat tedious description of the various types of defensive works has given some indication of the strength of these old forts and it is clear that many of them were almost impregnable to direct assault. Sometimes breaches were made in the palisades by pulling down battens with a bar and rope thrown over them, and fire was a weapon which reduced many a fortress. But very frequently other measures were necessary. Hence the many accounts we have in Maori tradition of surprise attacks—at daybreak, up little-used cliff-paths in the dark, in a storm when no sound of men's feet could be heard ; of masquerades of war parties as peaceful fishermen, as returning village people, or even as gigantic sea fish ; of treachery—a secret opening of gates, or a false peace and an unexpected return. Records of Maori warfare form a dark tale of ambuscades, stratagems, treachery and ferocity, mingled with a tactical ability and a rude chivalry that compel admiration. At times none of these ways of attack seemed feasible and the *pa* was besieged.

Now practically all the cultivations of the people lay outside the fort, so that to be able to resist a siege stocks of provisions had to be kept inside the enclosure. Vegetable foods were stored in pits underground and flesh foods were dried and preserved in storehouses or on tall stages. But the weak point was usually lack of water. As a rule the hill-fort had no spring within it, and anyone venturing out to get water was cut off by the besiegers. In some forts attempts seem to have been made to keep an artificial supply. On occasions water was stored in gourds. Best[1] describes and illustrates the use of underground pits as reservoirs for the precious fluid, while some of the bottle-shaped subterranean chambers at Korekore were probably utilized for the same purpose.[2] But as a rule water storage was of a very elementary kind, and time and again a beleaguered fortress was taken or surrendered through lack of water. Nevertheless the siege was often a protracted affair, lasting for days or even weeks,

[1] *Dominion Museum Bulletin*, no. 5, pp. 81 sqq.

[2] Firth, *op. cit.*, pp. 9–10.

while one blockade, the longest recorded, endured for seven months.[1]

Despite the preoccupation of this paper with the Maori *pa* as a fortified position, it must not be imagined that it was purely a war-time dwelling. It was not only a military stronghold ; it was the home of the people, the centre of their social and economic life as well. Excluding a few defended posts on isolated rock pinnacles, which served as occasional retreats only in time of stress, the average Maori *pa* was a place in permanent occupation. And the economic aspect of the settlement was not lost from view. The site, though primarily selected for its defensive character, was also chosen for its proximity to sources of food supply—to fertile soil, fishing grounds, or a forest where birds were plentiful. It is as the home of the people, the centre of their social and economic life, no less than as their defensive stronghold and the focus of their military activity that the Maori *pa* has its peculiar interest for the archæologist, the anthropologist and the prehistorian.

In conclusion I wish to acknowledge my indebtedness to Mr Elsdon Best, on whose well-known writings I have drawn liberally at certain points in this paper. My thanks are also due to Mr O. G. S. Crawford for references to the literature of British earthworks and to my friends Mr and Mrs Philip Williams of Bridehead, Dorset, to whose kindly thought I owe my visits to Eggardon and Maiden Castle.

The literature on Maori hill-forts is scanty. The following list gives the more important papers dealing with the subject and also the relevant sections of more general works. Incidental references will be found in the footnotes of the foregoing article.

ELSDON BEST.—"Stockades and Earthworks in New Zealand." *American Antiquarian*, 1895, xvii, 154–6 ; *The Maori*, 1924, ii., ch. xv, pp. 304–52 ; " The Pa Maori," *Bulletin Dominion Museum*, 1926, no. 6, Wellington. This is a fully documented and authoritative work with plans and illustrations.

RAYMOND FIRTH.—" The Korekore Pa: an ancient Maori Fortress." *Journal Polynesian Society*, 1925, xxxiv, 1–18.

A. HAMILTON.—*Maori Art.* Dunedin, 1896, pp. 71–9 ; 121–9.

W. H. SKINNER.—" The Ancient Fortified *Pa*." *Journal Polynesian Society*, 1911, xx, 71–7.

S. PERCY SMITH.—" Maori History of the Taranaki Coast." *Memoirs Polynesian Society*, 1910, vol. i, *passim* (plans, photographs and descriptions of *pa*).

[1] S. Percy Smith, *History and Traditions of the Taranaki Coast*, 1910, p. 365. For other instances of sieges see *Ibid.* pp. 244, 246, 288, etc.; also Best, *op. cit.*, pp. 335–8. The occurrence of such sieges of *pa* in Maori warfare is an interesting commentary on the opinion expressed by A. H. Allcroft (*op. cit.*, p. 210), that " of sieges, and blockades, it is practically certain the prehistoric period knew nothing. A single rush, a succession of rushes, at most a day's assault, was all that was to be feared." Such was not the case with the neolithic Maori.

# The Danube Thoroughfare and the Beginnings of Civilization in Europe

by V. Gordon Childe

WHILE high civilizations were growing up in Mesopotamia, Egypt, and the Aegean, continental Europe was still recovering from an ice age. Though the glaciers had retreated, the high passes that led across the Alps from the favoured Mediterranean to the interior were still virtually closed by snow. The tundras and steppes where the men of the Old Stone Age had hunted the reindeer were now for the most part covered with a dense forest fostered by the damp climate then ruling. Through the belt of forest and mountain that fenced off northern and western Europe early man could not easily penetrate. To reach Britain or Denmark he must take ship and face the perils of the Atlantic in a dug-out canoe or some only slightly superior craft. But one moving road leads right into the heart of the continent. From the Black Sea to Bavaria the Danube opens out a passage way far safer than the stormy Atlantic. Moreover it leads into territories where the uncongenial primeval forest did not grow so densely nor so inhospitably as on the coasts or highlands.

Large tracts in Central Europe are covered with a deep deposit of fine wind-born dust that had formed during the dry ice ages. This aeolian soil termed " löss " is unfavourable to the growth of heavy timber, incidentally it provides ideal agricultural land.

Sailing up the Danube through the Iron Gates, a voyager from the Aegean would come upon high folds of open löss, actually cut by the river, in Serbia and then again, after passing a stretch bordered by swampy alluvium, above Buda Pest. From the Austrian Danube patches of löss interrupted only by belts of forest land constituted an inviting path to the head waters of the Oder and the Vistula. From the löss plains of Moravia it would have been possible to reach similar patches in Bohemia. Thence the Elbe invited descent and led on to the löss areas of Saxo-Thuringia. Up the Danube from Vienna smiling

THE DANUBE THOROUGHFARE
R. VISTULA
R. ODER
R. ELBE
R. MARCH
R. DANUBE
R. TISZA
R. MAROS
R. MAIN
R. NECKAR
RHINE
R. DANUBE
BRENNER PASS
BAKONY MT
Weikersdorf
Gata
Lenyel
Babska
Csorvas
Arad
Pecsmos
Csoka
Obeba
Orlodea
Vinca
Cinnabar
Native Copper
Sand
Antimony
Gold
Copper
Tin
Loess deposits
Mines
0
50
150 MILES

löss lands opened out in lower Bavaria above Passau, once the forbidding valley between the Wiener and Böhmer Wälder had been negotiated.

Beyond the Swabian Jura, which in places was neither really precipitous nor very densely forested, lay more open country in the Neckar valley and then on both sides of the Rhine. That river might also be reached without much difficulty from Thuringia by way of the Main valley; and, once on the Rhine, an adventurer might easily be tempted down stream to the North Sea or, branching off westward, into the löss lands of Belgium and northern France. Thus a veritable corridor lay open right across the centre of Europe.

But the Danube did more than lead to lands fit for settlement. In its valley are many lodes of ores and precious metals. The mountains of north Serbia are veined with copper ore and lodes of cinnabar and galena. The richest gold fields in Europe are situated in western Transylvania. They can be most readily reached from the Danube by following the Tisza and the Maros. It was by this route that the informants of Herodotus communicated with the El Dorado of the Agathyrsi. The same mountains contain copper ore. There is more gold and copper in the mountains of western Slovakia again accessible from tributaries of the Danube. And in Bohemia are deposits of tin—a rare metal which in antiquity was in great demand from the moment bronze was discovered till it was replaced by iron.

Finally the shoals of sturgeon and other excellent fish that swarm in the waters of the lower Danube would tempt explorers to venture up stream there to discover the prizes of land and minerals just enumerated. That early men from the civilized Aegean yielded to these temptations, discovered these prizes, and diffused their culture along our corridor, we shall now briefly show.

It must be remembered that the shores of the Aegean can only feed a very limited population, and seldom offer a more inviting hinterland. Until a regular system of industry and trade makes it possible to supplement local food supplies by imports from abroad, the population must be continually overflowing. Even in early historical times, when the rudiments of a commercial system were already growing up, the Greek cities of the coast were constantly forced to find an outlet for surplus citizens in colonization. And the further we go back in time the more urgent must this need have been. Geographical conditions had determined that the colonists must proceed by sea. And it is well established that man became an adventurous navigator at a

surprisingly early stage in his career : in Scotland even before he had learned to polish stone, to cultivate grains, or to tame cattle and swine.

It is therefore intrinsically probable that peoples in the earliest food producing stage of culture should already have found their way through the Hellespont and have reached the Danube mouth. The shoals of fish would then entice them by gradual stages up the river. The early steps in their progress will perhaps be revealed when the numerous mounds in the Dobrudja and in north Bulgaria have been more thoroughly explored.

At the moment the lower Danube has yielded only isolated clues to be mentioned below. Clear vestiges of the first settlement begin above the Iron Gates. An ideal halting place for primitive fishers sailing up the Danube would have been Vinča, a little below Belgrade. Here a fold of löss comes right down to the river bank ; at the foot of the ridge a brook flows into the Danube; incidentally, in the immediate hinterland is a deposit of cinnabar where traces of ancient workings have been observed. The open löss hillock, raised above the reach of floods, was certainly early occupied by men ; the accumulated ruins of their huts and refuse have raised the level of the land by some 8 metres. The site has been very carefully excavated by Professor Vassits of Belgrade, who distinguishes at least three phases of culture—these we may term Vinča I, II, and III.[1]

Material precisely similar to that from Vinča I is found at other sites further north, notably at Csoka on the Tisza (opposite Zentas) and at Tordos on the Maros. Csoka like Vinča stands upon a ridge of löss cut by the river; Tordos, similarly situated, lies in the heart of the auriferous region of Transylvania. The location of these ancient settlements along the classical way of approach to the gold fields is significant. The first inhabitants of these settlements were cultivators who tilled their fields with stone hoes (what are generally termed " shoe last celts ") but at Vinča and Csoka they also caught sturgeon and other fish with the aid of horn harpoons, parallels to which come from the lower Danube in Bulgaria and from Kizil Köi on the shores of the Bosphorus. They dwelt in " pit dwellings," oval excavations in the soil roofed with wattle and daub. What interests us is their affinities to the Aegean peoples as revealed in their handiwork. Their religious paraphernalia provides one indication ; they manufactured rude images of a female deity in clay as did the early folk of Crete,

[1] Vinča : M.M. Vassits in *P.Z.* ii, and *BSA*, xiv.

1.—FIGURINE, ČARŠIJA (= VINČA II)

2.—LID, VINČA I

NATIONAL MUSEUM, BELGRADE

*facing p.* 83

Greece, and Anatolia. Miniature altars—little clay tables with four legs—were modelled for purposes of cult as in Thessaly from the earliest period on.

The pottery shows more distinctly the fundamental kinship; for the history and traditions of a primitive folk are often crystallized in their pottery. The commonest variety is a black-faced fabric decorated with incised patterns akin to what has been termed "black Mediterranean ware."

A very favourite ware at Vinča also used at Tordos was decorated by burnishing highly narrow strips of the surface so that the pattern stood out in a shiny black on a grey ground. The same technique was in use at Boz Euyuk in Phrygia during the third millennium B.C. and in Thessaly in the second neolithic period. At other times the ornament takes the form of shallow flutings which may be exactly paralleled in both the areas mentioned and also at the early cemetery of Yortan in Mysia.[1]

Another ware, better represented at Tordos than at Vinča, is red outside save near the rim: the inside and the strip near the vessel's mouth have been blackened by the reducing action of the ashes and carbon monoxide upon the iron oxide in the clay. The same feature is characteristic of the pre-dynastic pottery of Egypt.

One style of vase manufactured in this ware was a goblet with a tall solid stem; the same form occurs in red ware at Troy II and, in a different fabric, in neolithic Crete.

Many pot lids from Vinča I, Csoka and Tordos have been modelled to suggest a human face (plate I, fig. 2). Similar anthropomorphic lids were manufactured in large numbers at Troy.

Finally many vases have odd "proprietary marks" scratched on them. Many of the signs employed can be paralleled on spindle whorls from Troy II, and on pots from pre-dynastic Egypt (fig. *e*, p.88).

None of these analogies refer to portable objects of a sort likely to have formed the vehicles of primitive trade. They suggest rather an ethnic connexion between the first settlers at Vinča and the peoples of the Aegean. Quite naturally the closest parallels are with the manufactures of Troy, the great settlement that stood on the waterway between the Aegean and the Danube mouth. That does not so much

[1] Polished and fluted wares in Thessaly; Wace and Thompson, *Prehistoric Thessaly*, pp. 102, 105, 114. The stratification shows that they belong to the second period—not as Tsountas thought to the third.

imply that Vinča was a colony from Troy, but rather that the first Serbians (or some of them) were a branch of a stock that settled also on the shores of the Hellespont; for characteristic Trojan forms, *e.g.*, jugs and cups with handles, are entirely lacking as yet on the Danube.

But another class of objects show that this racial kinship was cemented by continued commercial intercourse. Vinča and Tordos have yielded clay vessels that imitate stone vases, marble pendants comparable to the marble "owl idols" of Troy II, and even copper beads. The Vinča I people wore shell bracelets, possibly imported from the Aegean, and stone bracelets were fashionable at Tordos.

As raw cinnabar ore was found in the lowest levels at Vinča, this may have been one article of commerce, but naturally the trading activities extended to Tordos. So the little settlements of Aegean fishers became outposts of Troadic commerce.

But the Danube leads far beyond Vinča and the civilizing current was not all diverted to Transylvania. In lower Hungary there were no accessible löss patches abutting on the river. Those reaches, particularly when the heavy rain on the Danube catchment swelled the river above its present level, ran through inhospitable swamps where no trace of settlement is to be expected or has in fact been found. But on the löss lands of Moravia[1] a culture flourished which has many analogies with that of Vinča I. Its authors were peasants in the stage of garden culture. They tilled their plots with the same stone hoes as the Vinča folk. They cultivated in them a species of wheat[2] (*Triticum monococcum*) which was also grown at Troy and in Thessaly and (at a later date at any rate) in Bosnia and Hungary. They lived in rude pit dwellings like those of Vinča I; they sometimes manufactured clay idols of naked women again like those of Vinča; they ornamented their vases with plastic animals' heads—a procedure also noted at Vinča (plate I). The vases themselves are said to imitate gourds which will certainly not ripen north of the Bakony to-day, but may in those days have served for vessels in Serbia as they certainly did in Anatolia.

What is most striking, the people of Moravia imported the shell of a Mediterranean mussel—*Spondylus gaederopi*—to wear as bracelets. This is perhaps the very shell that was worn in Vinča I and in any case hoards of them have been found in Bulgaria.

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[1] Danubian culture: Childe, *Dawn of European Civilization*, 1925, pp. 171-183.
[2] See Kozlowska, in *Bull. Internat. Acad. Sci. de Cracovie*, 1920, B, 1-10.

# PLATE II

DANUBIAN I POTTERY FROM MORAVIA
MORAVIAN MUSEUM, BRNO

*facing p.* 84

Whether these Moravian peasants actually came themselves up the Danube is immaterial ; their culture did. Its affinity with that of the middle Danube has just been demonstrated ; its meaning is unambiguous. The grain cultivated did not grow wild north of the Balkans ; the domestic pigs were probably sprung from a race (*Sus vittatus*) native to Hither Asia; the sheep had a like origin in the Asiatic *Ovis vignei*.[1] These animals and plants can therefore only have been brought up the Danube : the process is not reversible. The civilization that had thus come up the Danube does not stop short in Moravia. Its authors, commonly termed Danubians, were not yet tied to any fixed place by commerce ; they had settled where good land was available. At the same time their methods of cultivation compelled them to move on. Like peoples in the same stage of culture to-day in the Sudan or north Borneo they had not learned the secret of rotation of crops. Hence to obtain a good yield they must bring fresh strips of land into cultivation every two or three years. Their wretched pit-dwellings were easy enough to build, and would soon become uninhabitable. So the settlements were moved periodically, every twenty years at least, judging by modern analogies. In any case no site was occupied long enough to form a mound such as we saw in Vinča. Moreover, as the populations grew, each community would send out colonies just as the negro cultivators in Uganda do to-day. And so the Danubians spread slowly but surely over the löss. They planted their settlements in western Galicia and Silesia. They crossed the divide into Bohemia, they spread down the Elbe and up the Danube, they forced their way through the forests to the Neckar and the Main, they occupied the whole Rhine Valley ; eventually they colonized the Hesbaye district of Belgium.

Everywhere their presence is marked by the pottery and stone hoes which characterize them in Moravia.

Only in their struggles with forest and mountain they lost some elements of civilization : they gave up making figurines or decorating their pots with animals' heads. But even on the Rhine and in Thuringia they wore the *Spondylus* shell ornaments of Mediterranean origin ; such were regularly deposited in the graves.

Such was the method by which the " neolithic culture " reached Belgium. The Danubians brought it thither at a time when the

[1] Cf. Duerst, in Pumpelly, *Explorations in Turkestan* (Carnegie Publications, 73) vol. II.

natives (Rutot's "Spiennians") had no domestic animals nor cultivated plants and made implements by chipping, and not by polishing.[1]

The process of expansion just described was naturally gradual; it must have taken several centuries. All that time we may assume that intercourse was maintained at least between the middle Danube and the Aegean. About the period of Vinča II, the evidence of contact with the Aegean becomes particularly clear; it is attested by the introduction of new ritual types—"a goddess" nursing an infant as in central Greece and Thessaly; clothed statuettes wearing aprons of linen; sitting types.[2] Probably to this level belong miniature tables supporting bowls found at Vinča and elsewhere to which Thessaly offers analogies.[3] From Csoka and Tordos, moreover, come several vases standing on human legs, exact parallels to which are known from the Yortan cemetery in Mysia.[4] Finally from Vinča II comes pottery ornamented with daubs of red colouring matter applied after the burnishing and firing of the vase. This very same crusted ware is found in eastern Thessaly in the third period about 2200 B.C. Possibly this last innovation did not come from the south but was transmitted to Thessaly from the Danube basin; for there is reason to believe that the technique was developed on the western borders of Transylvania. In any case it enables us to say approximately what period in world history we have reached. We are now in the latter half of the 3rd millennium B.C.

By that date Troy II had grown to a rich and powerful city through her control of the sea way to the Euxine and land ways to Asia Minor and Cyprus. We should expect to find positive evidence of her participation in the trade along the Danube from which a part of her wealth was derived. The evidence is not far to seek. In a series of graves and settlements along the Tisza and the Danube, and right away to Silesia and Thuringia[5] we encounter imitations of Trojan imports, together with actual objects of indisputably southern provenance. We have firstly clay copies of metal cups with high handles and two-handled tankards. From the graves come numerous copper trinkets, some of which reproduce forms popular at Troy in more precious metals, such as the wire spectacle spiral. That these products came

[1] *Bul. Soc. Anthr. Bruxelles*, xxxix, p. 63 n. 2.
[2] M.M. Vassits in *P.Z.* ii, and BSA, xiv.
[3] Wace and Thompson, *op. cit.* p. 111.
[4] In the British Museum.
Childe, *Dawn*, pp. 177-9.

up the Danube seems proved by the presence of ivory in a deposit of this period at Babska in Slavonia and the discovery of Mediterranean shells at Weikersdorf, Lower Austria,[1] while at Lengyel[2] in Hungary even shells of *Tridacna*, a denizen of the Indian Ocean, were buried in graves at this period. We are not obliged to assume that the folk in whose settlements or graves such objects have been unearthed themselves represent a fresh wave of colonization from the Aegean. The Troadic types appear still as strangers among native or perhaps eastern wares. The typical funerary vessel was a bowl on a high hollow foot which is often perforated with wide circular windows. Only one such bowl has been found at Troy and it is said to have come from the older village that preceded Troy II. Nevertheless we may infer that merchants and explorers from Troy were now about.

Naturally Trojan enterprise was directed first to the gold fields of Transylvania. It led in the end to the establishment of colonies on the approaches thereto. Near Arad, on the lower Maros and the Aranka, the villages Perjámos and Nagy Sancs arose which might pass for Trojan settlements. In any case the typical vase found there was a two-handled hour glass tankard of a form common in Troy II. Perjámos further yielded a torque of copper wire, the ends of which have been flattened and bent back (like fig. *a*, p. 88). The same sort of torque was well known in north Syria, whence an isolated specimen found its way to Egypt. The last-named example and a group recently discovered at Byblos seem to belong to the age of the XIIIth Dynasty (xviiith cent. B.C.) in Egypt.[3]

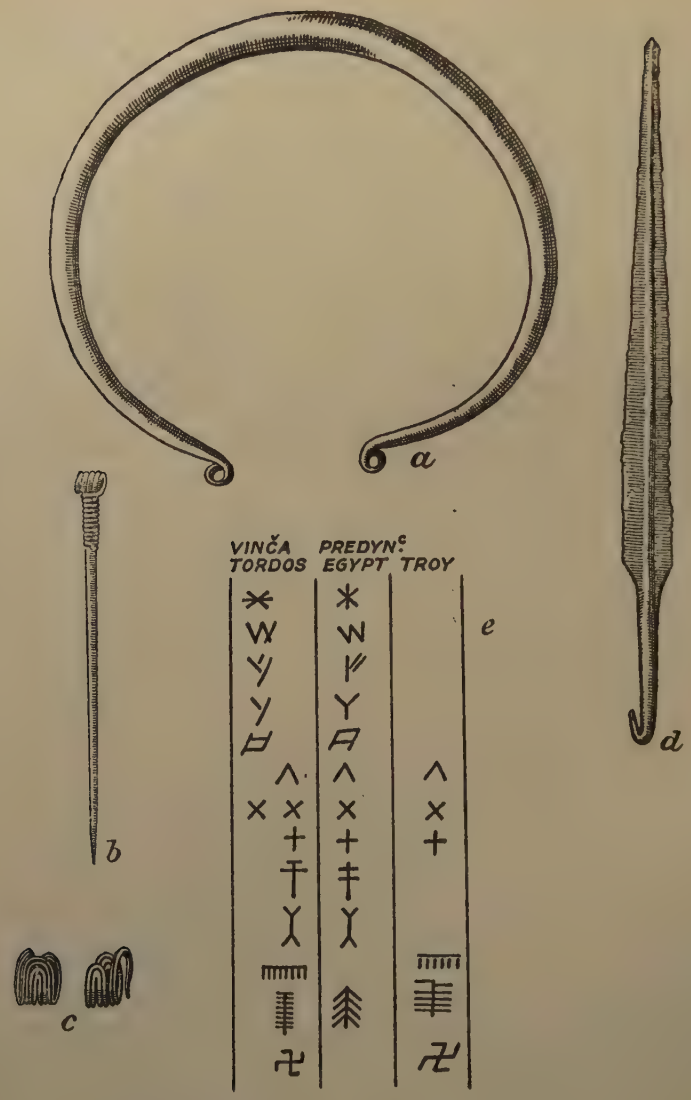
Further documents illustrating the intensity of south-eastern commerce along the Tisza and Maros come from the graves found at Ó Beba[4] not far from the junction of the rivers. These contained *inter alia* Mediterranean shells (*Pectunculus* and *Cardium*), a "knot-headed pin" (fig. *b*, p. 88), *i.e.* a pin of copper (? bronze) wire the head of which has been bent over and twisted round the shaft to form a loop, gold pendants the ends of which have been hammered out flat, and a gold disc ornamented with geometric patterns composed of series of nobs. The knot-headed pin occurs in Cyprus and at Troy; the gold pendants illustrate a type very common in Transylvania which is well

[1] *W.P.Z.*, x, 1-10.

[2] Wosinsky, *Das prähistorische Schanzwerk von Lengyel.*

[3] Carchemish: *Liv. Annals*, vi, pp. 91 ff; Byblos: *Syria*, vi, pp. 16; Egypt Petrie, *Illahun, Kahun and Gurob*, pl. xiii.

[4] *Arch. Ert.* xxiv, pp. 85 f; *Archiv f. Anthrop.*, xv, p. 253, pl.I.




*a*. "Ingot Torque," Gáta. ¼.
*b*. Knot-headed Pin, Bohemia. ½.
*c*. Troadic Earrings, Bohemia. ½.
*d*. Cypriote Dagger, Csorvas. ¼.
*e*. "Proprietary Marks" on Vases and Whorls.

represented in the hoards of jewelry from Troy. The form originated in Mesopotamia where it has recently been discovered in graves of the IVth millennium at Kish.[1] The technique of punctured ornament illustrated on the gold disc from Ó Beba has early parallels in the gold work of Crete and Troy. The juxtaposition here of indubitable southern imports and objects fashioned presumably of native gold, is very significant, especially as the local manufactures are so obviously inspired by exotic models. Still more conclusive evidence for the activity of southern traders is provided by the occurrence (unfortunately isolated) of two Cypriote daggers at Csorvas in the vicinity of Arad (fig. *d*, p. 88). Such daggers, though native to Cyprus, were also used occasionally at Troy and in the hinterland.

A counterpart to these foreign objects lining the path to the Transylvanian gold-fields is doubtless revealed in the vast hoards of gold ornaments and vessels that lay buried in the ruins of Troy II from the day of its sack till Dr Schliemann laid them bare. But the Trojan hoards also included bronze implements and weapons containing 10 per cent. of tin. These are probably the earliest dated specimens of rich bronze.

The origin of the tin which came gradually into use for alloying with copper in the eastern Mediterranean has long been a puzzle to historians. The evidence adduced above of extensive traffic from the Aegean and especially from Troy up the Danube at this very epoch suggests that one source might well have been Bohemia; for the Danube highway did lead into that country.

Now we have already noted that copper trinkets of Troadic form have turned up in early graves as far away as Silesia. And there is further evidence. A group of three mugs disinterred in the environs of Prague might have come from Troy itself they have such a Trojan "feel."[2]

Moreover the earliest bronze object found in Bohemia is a knot-head pin just like those from Ó Beba, Troy II and Cyprus.

Conversely among the stone battle axes found at Troy is at least one that reproduces a type very common in Moravia and Silesia at the epoch in question. Finally when, at a rather later date, a native bronze-using civilization arose on the upper Elbe, many of the types employed carried on Troadic traditions.

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[1] "Excavations of the 'A' Cemetery at Kish" *Field Museum Anthrop. Memoirs* I.

[2] Stocký, *Praha Pravěká*, 1925, p. 21.

A possible milestone on the path of this assumed trade is provided by some graves found in north-west Hungary close to the present Austrian frontier. The sites in question, Gáta and Jessehof Puszta, lie almost opposite the natural ports for the Slovakian copper and gold producing areas and beside the route which might connect these with the tin country of Bohemia. The graves belong for the most rather to the period of the local bronze age of Bohemia, but the pottery, notably hour glass mugs like those from Perjámos, is peculiarly reminiscent of Troy II. Among the bronzes were torques of the type already described from Perjámos, and basket shaped earrings derived from a Trojan form (fig. *c*, p. 88).

But about 1800 B.C. the great second city of Troy was stormed by barbarian hordes and razed to the ground. The chief mart for Danubian products was gone! About the same time a new route between Central Europe and the Mediterranean was opened up across the Brenner Pass, which was now traversable as a result of climatic changes. As a consequence of these events trade along the middle Danube languished. A vigorous local bronze-using civilization, known as the Aunjetitz culture, arose indeed in Bohemia and Saxo-Thuringia, but in this development Hungary had no share. Only the northwest corner was affected by the new industry. The reason for this eastward extension is clear; it was Slovakian copper that was mixed with Bohemian tin to make the Aunjetitz bronzes. Now, the raw copper was transported in the form of the torques with flattened ends alluded to above. A thousand were found together in one hoard in northwest Hungary[1] (and so on the above-mentioned line between Slovakian copper and Bohemian tin); smaller hoards of these torques, unassociated with other objects, are not uncommon; when analysed they are usually found to consist of pure copper. The use of a north Syrian type of torque for ingots by the exploiters of Slovakian copper lodes is very significant. Its significance would be enhanced if, as seems probable from the number of such torques in the Byblos hoard, they were also used as ingots in Asia Minor. The inference is that the exploitation of the copper mines from which the Bohemian bronze industry was supplied, had been initiated by metallurgists come from Asia Minor. These considerations lend force to the numerous survivals of Troadic traditions in the earliest Bronze Age of Bohemia—survivals which have been enumerated elsewhere.[2]

[1] *Zs. f. Ethnol.*, 1896, p. 80.
[2] Childe, *Dawn*, p. 192.

The discovery and original exploitation of the Bohemian tin deposits, and hence the inauguration of a bronze industry in central Europe was due to explorers coming up the Danube from the southeast.

Now the first dated bronze objects found in a definite context in Britain come from the graves of the so-called Beaker Folk, who reached these islands from Central Europe.

It therefore seems likely that we owe our first metallurgy in the long run to those explorers from Troy whose tracks we have been following up the Danube. So not only was that river one of the routes by which a so-called "neolithic" culture reached northwestern Europe, it was also a channel in the diffusion of the arts of metallurgy northward and westward from the Ancient East.

# Prehistoric Timber Circles

by Mrs M. E. Cunnington

THE photographs here reproduced, were taken from the air on 30 June 1926, by Squadron-Leader Insall, v.c., m.c., who was then stationed at Netheravon. The large circular earthwork which appears with a series of concentric dots within its area had always been regarded as a " ring " or " disc " barrow much wasted and defaced as a result of many years cultivation. The ring barrow is a type of pre-historic burial place which occurs comparatively frequently on the Downs of Wiltshire and adjacent counties but is rare elsewhere. It consists of a circular earthen bank with a corresponding ditch, usually on the inner side. The actual burials, apparently invariably after cremation, are usually found in one or more mounds near the centre of the circular area thus enclosed. The banks and ditches are continuous and form unbroken rings; they vary in size from a few yards in diameter up to nearly 200 ft. The smaller dark rings shown on the lower part of the photographs near the Amesbury road probably represent the filled-in ditches of barrows that have been destroyed by cultivation.

The earthwork under discussion, in its wasted state, seemed outwardly to have all the characteristics of a very large but otherwise normal ring barrow, *i.e.*, a ditch within a circular bank, and a raised area in the centre. The earthwork lies in a large open arable field, and at the time the photograph was taken the whole area, earthwork and all alike, was covered with a flourishing crop of wheat, already in ear and nearly its full height. The arable field is bounded on the east (right side on the photograph) by the high road from Netheravon and Upavon to Amesbury, it being distant about one and a half miles from the latter village; on the north (upper side of photograph), it is bounded by the new Fargo road to Larkhill camp; the rectangular light patch adjoining the earthwork is an uncultivated plot used as a stand for ricks; the light lines running over the earthwork and all across the arable ground are deep plough furrows. To grasp the full significance of the photograph it must be borne in mind that when it was taken the

"WOODHENGE": OBLIQUE VIEW FROM THE SOUTH TAKEN BY SQUADRON-LEADER INSALL, V.C., M.C.

*Reproduced by permission of H.M. Stationery Office*

*facing p.* 02

whole area was covered by a tall crop of wheat so that what is seen must be irregularity in colour and growth of the wheat, the actual surface of the ground being hidden. The soil here is only a few inches thick over the chalk, and the long fibrous roots of the wheat penetrate into it with difficulty, if at all. On the other hand, wherever a hole has been previously dug into the chalk the disturbed chalk disintegrates and becomes comparatively soft, and is moreover generally mixed with soil and decayed organic matter, so that the long rootlets penetrate it with ease, and finding congenial conditions the corn grows finer than on the surrounding undisturbed chalk. This is really the secret of many archæological discoveries from the air. Old ditches, pits, and so on, completely filled in and obliterated on the surface, reveal themselves in the growth of crops, creating conditions easily seen with the naked eye but requiring a bird's eye view to follow up.

It was, therefore, realised at once that the dark spots within the earthwork appearing on the photograph in all probability represented pits of some kind, just as the dark ring enclosing them represents actually only the taller and deeper coloured growth of corn over the filled and obliterated ditch, the ditch and bank being themselves quite hidden.

The plan of the circles of holes thus revealed is more or less suggestive of that of Stonehenge, and at once excited great interest among archæologists to whom the photograph was shown by Squadron-Leader Insall.

Arrangements were made to test the site by excavation and this was done in August 1926 ; the work was carried on for five weeks when the southern half of the circle was examined, with most interesting results. Presuming that the unexcavated half of the circle agrees with that already done, as the photograph gives every reason to believe, there are six roughly concentric rings of holes surrounded by a ditch immense in proportion to the area enclosed. To test the ditch three sections were cut through it, one each on the east, south, and west sides ; in each section it showed the same general features and was found to be unexpectedly large, measuring some 25 ft. across the top, from 10 ft. to 14 ft. wide at the bottom, and some 7 ft. deep. On the photograph there appears to be a break in the continuity of the ditch on the N.E. side towards the Fargo road (on the upper part of the plate) ; this no doubt represents the entrance to the circle but it has not as yet been proved. The diameter of the earthwork, measured from bank to bank, is approximately 250 ft. On the outer side of the

ditch there are still slight remains of the bank which must once have been proportionate in size to that of the ditch. It must, of course, be understood that the ditch and all the holes were completely filled up and invisible on the surface.

Clear evidence was obtained in excavation that the six concentric rings of holes once held posts or tree trunks varying from 1 ft. to 3 ft. in diameter according to the size of the hole. Plate II, fig. 1 is from a photograph of a model made to scale of the series of holes as excavated; *a*, *b*, *c*, represent trial sections cut through the ditch; the position of the entrance at *d* is approximate only. The holes of the second and third circles appear oblong on plan on account of their ramps, and this brings out how irregularly spaced the holes are. The site was indeed that of an elaborately designed timber construction, possibly comparable in some respects to the more familiar stone circles.

The size and depth and distance between the holes varies in each circle, but in each circle is fairly consistent throughout. In the outermost circle the holes are 6 ft. apart from centre to centre, from 1½ ft. to 2 ft. deep and from 2 ft to 3 ft. in diameter. In the second circle the holes were larger and further apart, averaging about 4 ft. in depth, and from 3½ ft. to 4 ft. in diameter. The largest of all were those of the third circle, being about 6 ft. deep, with a diameter at top of from 4 ft. to 5 ft.; the holes of the three inner circles were all much alike, about 3½ ft. to 3 ft. in depth and 2 ft. to 3 ft. in diameter. It is computed that the outer circle probably consists of 64 holes; the second 32; the third, 16; the fourth, 20; the fifth, 20; and the sixth, 14 holes. In addition to the six circles of post holes there is an inner seventh series of holes of quite different character; they are shallow and very irregularly cut; whether they really form a seventh circle, and what purpose they served, are both alike at present uncertain.

Two burials were found during the excavations, one, a crouched skeleton of a child, near the centre, and the other a crouched skeleton of an adult in a grave dug below the floor of the ditch in the eastern section.

As a result of excavation it was found that the raised centre of the circle was not due to the remains of a mound but to the fact that the ground had been pared off all round from the centre, towards the edge of the ditch, so that the centre is the natural level of the ground, and only appears raised as a result of the artificial lowering of the surrounding area.

1.—"WOODHENGE": MODEL SHOWING AREA EXCAVATED DURING 1926. THE LETTERS *a-d* INDICATE TRENCHES CUT

2.—"WOODHENGE": VERTICAL VIEW TAKEN 30 JUNE, 1926, FROM A HEIGHT OF 4000 FEET, BY SQUADRON-LEADER INSALL, V.C., M.C.

*Reproduced by permission of H.M. Stationery Office*

*facing p.* 94

The monument is, so far as at present known, unique either in the British Isles or abroad, but probably there are others as yet undiscovered waiting to be revealed by photography from the air or by other means. As it stands at present it is the most sensational archæological discovery made by means of photography from the air, because unlike that of the continuation of the avenue at Stonehenge, it was quite unsuspected and reveals a new type of monument.

As to the purpose for which it was designed, or the date of its construction, it would be premature to speak now, only about one half of the circles having been examined. The objects found have been few, and pottery, which usually affords the most valuable clue for dating purposes, was present only in small fragments.

It is hoped to continue the excavation of the site in the summer of 1927.

# Notes and News

## THE TALAYOTS OF MAJORCA

The pre-historic inhabitants of the Balearic Islands built small stone forts or towers, called ' talayots.' These are either rectangular or round, and occur either singly or in groups. The stones of which they are constructed are sometimes very large—two of these in a tower at La Canova, near Arta, are twelve feet long and three feet wide ; and the walls are fourteen feet thick. The surface around it is thickly strewn with potsherds, including fragments of red glazed ware,—like the Samian pottery found on Romano-British sites,—and fragments of amphorae, proving that it was occupied during the early part of the Christian era. On the other hand, bronze objects of the Bronze Age have also been found in talayot settlements, and some of these objects can hardly be later than 1000 B.C. This implies a long period, during which one might expect to find evidence of development in the methods of construction of the talayots. It seems possible that the earliest forms of settlement may have been normal hill-forts with stone walls, such as occur on the tops of several of the hills of the island ; and that the talayot settlements with their towers may be a later type of fortified village adapted to the lower ground. Several of the smaller hills around Arta are crowned by small round forts, consisting simply of a wall of big stones roughly squared, set round the top of the hill. This seems to represent a primitive type such as one might suppose to be earlier than the more elaborate villages. Some of the forts contain citadels in the centre, the best example being that of Encinar des Payeses. The main entrance is four feet wide and covered by a single lintel-stone, six feet long and two and a half feet thick ; it rests on two uprights, one of which is seven and a half feet high, and has been dressed to receive the lintel. There is a similar, but smaller ' trilithon ' entrance in the opposite side, now blocked up. In the centre is a citadel with a sloping ramp. There are remains of walls everywhere inside. There is much pottery lying about, some of it plainly of Roman date—Roman coins have been found here—but some of it probably earlier.

The main entrance is familiar to all archaeologists, it is illustrated in Cartailhac's *Monuments primitifs des Iles baléares*, and in many text-books. It is regrettable that the whole fort should be threatened with destruction, for building purposes; and it is to be hoped that the endeavours to preserve it will succeed. To many, this fort and its gateway are typical of Balearic archaeology. It may be suggested that the free-standing towers represent the central citadel of forts such as Encinar, adapted to the needs of a settlement on lower ground.

## IRISH MEGALITHS

A recent visit to New Grange, the most celebrated of Irish megalithic tombs, convinced one that it must have been constructed in the Bronze Age. There is presumptive evidence in support of this view, but one piece of direct evidence has hitherto been overlooked. The central burial-chamber is approached by a long passage, narrowest near the middle. This passage is flanked with upright stones, several of which are ornamented with sculptured designs. (See Coffey, *New Grange*, Dublin, 1912). Now the surface of one such (on the right hand as you go in, at the narrowest part) has been made smooth by chiselling *before* the ornament was applied ; and the marks of the instrument used can still be seen very plainly. It was a chisel with an edge very slightly serrated or chipped, doubtless by use. The upright stone is of a soapy texture. I do not think that anything but a metal chisel could have done this. It would be interesting to know whether, in the Dublin Museum, there are any bronze chisels whose working edge agrees in width with these marks ; and if so to what period of the Bronze Age the type belongs. It is difficult also to see how the elaborate and sometimes deep incisions on the stones of New Grange and kindred Irish monuments can have been made except with metal tools. Some of this ornament can be proved to have been sculptured before the stones were placed in their present position.

About 640 yards to the south-east of New Grange is a large round barrow standing in the centre of a circular earthen rampart. The diameter of this circle is 154 yards. Comparisons are suggested with the disc-barrows of Southern England and with the Giant's Ring in Antrim. The present example differs, however, from disc-barrows both in the size of the central mound, and in the absence of any visible ditch associated with the bank. The Giant's Ring has a stone burial-chamber at the centre. One of the four earthen rings near the Castle

of Comfort, on Mendip, has three large flat mounds within it, but not placed in the centre. About two miles to the east of New Grange is another circular earthen enclosure, much higher and less symmetrical in outline. The longest diameter is about 165 yards. There is no sign of a ditch or central mound ; but in both instances ploughing may well have obliterated such, if they existed.

Almost a mile to the north-east of New Grange is a long earthen mound, oriented east-north-east and west-south-west ; it has the appearance of being a long barrow. In one place on the north side the mound has been dug into and an upright slab exposed. At the east end is a round barrow or cairn, with the remains of a small circle of stones revealed by digging. There is another round barrow not far from the west end. These smaller cairn-circles occur close to the larger chambered cairns on the ridge of Slieve-na-Calliagh (Lough Crewe). The stones forming the chambers and passages of these smaller cairn-circles are covered with decoration, like those of the large ones ; and they belong presumably to the same period, the early or middle Bronze Age. In plan these Irish cairn-circles closely resemble those of the Scilly Isles and west Cornwall.

The photographs from which the annexed illustrations (see plate) have been made were taken by Mrs Keiller last April, and thanks are due to her for permission to reproduce them here. The upper one shows the detail of the spiral ornament on a stone at New Grange—one of the curb-stones of the mound—situated immediately opposite the entrance. The lower one is an admirable view of one of the smaller cairn-circles on Slieve-na-Calliagh, taken from the top of one of the biggest cairns of the New Grange type.

The Irish sculptured ornament of the Bronze Age has recently been studied by Professors Breuil and Macalister and Mr Miles Burkitt. The results are published in the *Proceedings of the Royal Irish Academy*, vol. xxxvi (1921) ; and by Mr Burkitt in *Ipek : Jahrbuch für prähistorische und Ethnographische Kunst*, 1926 (Klinkhardt und Biermann, Leipzig).

## MONGOLIA

The American expedition which has found dinosaurs' eggs in the Gobi desert has also found abundant traces of human occupation, in the form of worked flints and ornaments of egg-shell. Full details naturally are not yet available, and criticism may be premature. But

1.—SCULPTURED STONE AT ENTRANCE OF PASSAGE, NEW GRANGE
*Ph.* Veronica Keiller

2.—CAIRN-CIRCLE SLIEVE-NA-CALLIAGH (LOUGH CREWE)
*Ph.* Veronica Keiller

*facing p.* 98

when it is suggested, by Dr Fairfield Osborn in *Nature* (7 August 1926), that the European cultures of St. Acheul, Aurignac, Le Moustier, Mas d'Azile and Campigny are all represented, one cannot help wondering upon what these conclusions are based? It is a far cry from France to Mongolia ; and the latter country has yet to provide a site where stratified deposits may be investigated. Even then synchronism will be difficult to establish. The expedition is led by Dr Roy Chapman Andrews. The area is one that from an anthropological point of view is most promising. Dr Andrews has published an interesting and readable account of the work of the expedition up to 1926 (*On the Trail of Ancient Man*, Putnam's Sons, 25s.), and one is full of admiration for the ability and enthusiasm of the whole party. The bulk of the work so far has naturally been palaeontological, and has been crowned by the fullest success. There are some reasons for sharing the writer's expectation that similar good results will follow when the trail of ancient man is followed more closely ; but the absence of caves is unfortunate, and one would expect, on *a priori* grounds, that really ancient human fossils will be difficult to locate. Dr Andrews' address to the Royal Geographical Society of London was published in the *Geographical Journal*, January 1927.

## WOODHENGE

Mrs Cunnington's account of the excavation of the newly-discovered site near Durrington Walls appears on page 92 of this number of ANTIQUITY. The story of its discovery—or rather, of the discovery of what it really was—is worth recording, and we therefore quote the following account from a letter just received from Squadron Leader Insall, V.C., who is now stationed at Basrah :—" I was flying a Sopwith Snipe on 12 December 1925, at about 2000 feet, over Stonehenge, when I noticed a circle with white chalk marks in the centre near Durrington Walls. Stonehenge was visible at the same time, and the two sites looked similar from that height. I photographed it shortly afterwards ; result—white chalk marks in the plough. Returning late one evening as the sun was setting I noticed there was a distinct depression inside the outer circle, and a gradually rising mound in the centre, both of which were revealed by the shadows. Having been told that it was only a ' mutilated disc-barrow,' and having looked it up in the *Wiltshire Archaeological Magazine*, I watched it to see what the crops might reveal. The only mutilation visible was caused by the

plough. In July, when the wheat was well up over the site, there was no further doubt. Five or six or perhaps even seven closely-set rings of spots appeared, and were photographed [see plate, page 92]. I climbed on to a hayrick in the same field a few days later, and although a few dark patches could be seen in the standing wheat, no pattern was visible, and they would have passed unnoticed. From the air the details of the site were as clear as shown on the photograph, if not clearer."

Since Mrs Cunnington's article was set in type, an account of a not very dissimilar monument has been printed. It is situated at Harendermolen, south-east of Gröningen and in that province, in Holland. The earliest interment belonged to the beaker period, and was surrounded by a broken ditch and two concentric circles of holes which had held wooden uprights. A full account will be found in the *Praehistorische Zeitschrift* (Berlin) vol. xv. (1924), pp. 52–61, by Dr A. E. van Giffen, of Gröningen. The significance of these facts will be apparent, but we refrain from comment until the excavation of the site is completed.

## " L'AFFAIRE GLOZEL "

For some years past a number of strange objects have been found at Glozel in France, not far from Vichy. They attracted little attention over here until M. Salomon Reinach referred to them in a letter to *The Times* (27 September 1926). The objects consist of clay tablets with incised characters, stones (some in the form of axes) with engraved representations of animals and with characters like those on the tablets, and the débris of a glass-factory ! At first the whole of this heterogeneous collection was assigned to the neolithic period by its discoverer, Dr Morlet. Later, however, the glass-factory was allowed to fade into the background. M. Reinach expressed the opinion that the style of the animal-engravings was " degenerate Magdalenian ; " and on the strength of this, proposed to assign an age of five to six thousand years to the Magdalenian period. In other words he suggested that the Cave period might have continued to 3000 or 4000 B.C. ! Such a suggestion, coming from any lesser authority, would be laughed out of court ; but M. Reinach's reputation, and his official position as Director of the S. Germain Museum, compel respect, even if assent be withheld. Accordingly the Editor determined to investigate matters for himself. He went to Vichy, and saw the site of the discoveries and the objects ; some of them are in Fradin's farm at Glozel, and some in Dr Morlet's

collection at Vichy. From both he received a most courteous welcome, which he wishes once again to acknowledge. He wrote an objective description of his experiences in the *Observer* (31 October 1926), in the hope that readers would draw their own conclusions. Perhaps it would have been better frankly to have expressed his scepticism at once; but he did not wish to be drawn into a controversy which might waste much valuable time and energy, and which would certainly be acrimonious and unprofitable.

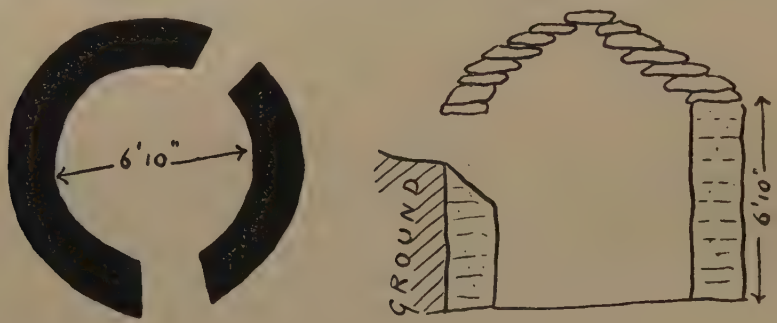
This scepticism was not removed by a report of the proceedings at the Academie des Inscriptions et Belles-lettres (*Temps*, 14 November), and by a letter from Professor Loth (*id.* 20 November). At that meeting M. Camille Jullian read a paper, explaining the discovery as a witch-doctor's outfit, and dating it to 250-300 A.D. M. Jullian was even able to translate some of the phrases! In the discussion M. Reinach defended his opinion, entirely disagreeing with M. Jullian's interpretation. He was supported, with qualifications, by Professor Loth, who regards the discovery as "perhaps the most important in the domain of archaeology which has been made in France for a century." Finally, in the current number of the *Antiquaries Journal*, M. Reinach summarized the discoveries, repeated his opinion that "all the finds . . . were undoubtedly genuine and neolithic" and that "any expression of scepticism is now out of date, and need not even be discussed." The glass-factory was referred to, but left unexplained.

In view of M. Reinach's last-quoted remark, it will be interesting to see what happens now that Abbé Breuil's report is published in *L'Anthropologie*, xxxvi, 543-58. The Editor had the privilege of discussing Glozel with M. Breuil at Paris, on his way back from Vichy, when the Abbé was good enough to read this report to him. There is no greater authority in the world on palaeolithic art; and his analysis of the engravings, as well as of the harpoons and other small objects, seems to an impartial observer to be conclusive.

It is always a thankless and unpleasant task to bring an accusation of forgery; but when such far-reaching conclusions are involved it becomes a duty. We went to Glozel hoping for the best, but prepared for the worst. We saw the site, the method of excavation and the objects found; and we were not favourably impressed. We do not say that none of the objects found are genuine; but when a site has been 'salted,' it ceases to interest, though not to amuse, the serious student. Our views will be published in the next number of ANTIQUITY.

## CORBELLING

Corbelled arches, vaults and domes are of interest to prehistorians because (to give only one instance) they occur in the primitive prehistoric structures of Western Europe. The corbelled vault, in a rudimentary form, occurs in the Long Barrows of Gloucestershire and in those of Sardinia. It occurs also in tombs of the second millennium at Ur in Mesopotamia (see *Ant. Jour.*, vi, plate 60). The corbelled dome is also found in the Gloucestershire Long Barrows—one over a burial-chamber at Belas Knap was to be seen until quite recently—and in the megalithic burial-chambers of Western Europe generally. A humbler example is to be seen on Dartmoor, near Postbridge. Here is a perfect specimen of a bee-hive hut with corbelled roof. But apparently the practice of building in this fashion was carried on




in historic times. Dr Eric Gardner, F.S.A., reports the existence of one at Nattadon Farm, Chagford. "It is very old, and is called a winnowing hut, now used as a chicken-house. There is only one other on the moor, but its roof has been mended, and externally at any rate consists of concrete. Ours is perfect; the roof is of beehive construction, just like the one at Postbridge. It is made of blocks of granite and a poor sort of mortar which is hardly more than tenacious mud. There is a narrow doorway, and a window at the back facing south-west, and when the wind blows you can hardly stand in it. In old days the corn was sprinkled on the floor of the hut during a gale, and in falling was winnowed. The hut is built against a slope, so that the door opens on to a patch of green by the roadside; but the bank behind is cut away, so that the field there is level with the window; this creates more draught. It is evidently a survival of a very old method of winnowing, and seems to be the only

one left about here, except the one near by which has had a new roof put on—at least it is new outside."

In Majorca similar huts are built to-day by the peasants. Near the bay of San Vicente a tabular limestone is worked and the construction of a hut is no difficult matter. The slabs of stone lend themselves easily to corbelling and this method is adopted for making the roof. Longer slabs form lintels above doors and windows.

## RHODESIA

It is satisfactory to hear that the Rhodesian Public Works Department is showing an interest in the great ruins of which Zimbabwe is the most famous. Mr J. F. Schofield, a professional architect, has examined and reported on the two series of buildings known as the ' Elliptical Temple ' and the ' Acropolis.' This account, which is carefully and critically written, is published in a series of articles in the *Rhodesia Herald*, beginning 22 January 1926. Being a trained and impartial man Mr Schofield arrives at the only possible conclusions as to date and origin, which are the same that I propounded twenty years ago. That is to say, the ruins are not earlier than the late Middle Ages and are to be ascribed to Bantu peoples. Fresh evidence, all tending the same way, has lately been adduced by Mr Douslin and the Rev. S. S. Dornan.

Mr Schofield's articles should be read by all who do not feel that the main issues have been finally settled, as well as those who have accepted the general scientific verdict but are interested in the details. It may be hoped that his records mark the opening of a new period in the study of southern Rhodesian antiquities. These are most important and valuable for the history of civilization ; and South Africans ought to regard them as part of the history of their country, in the same way that the Americans have for many years devoted themselves to the study of the Indians before and after Columbus.

In the *Journal of the African Society* Captain E. A. Norton writes a too brief article on ruins in the neighbourhood of Inyanga. These seem to be part of the same system, and perhaps part of the same site which I attempted to describe in my account of the ' Niekerk Ruins '—the second and third chapters of my book *Mediaeval Rhodesia*, which Captain Norton appears not to have read. There are endless terraces (built no doubt mainly for cultivation and not for defence as I had at first thought), and quite elaborate dwellings ; also some forts and a well defined road. These ruins lie in a remote and little-visited area, but

they have not wholly escaped attention. They are worthy of careful study and the official archaeologists should turn their energies upon them. That they are the work of a Bantu race is quite certain but their antiquity is perhaps a little greater than the ' experts ' gave Captain Norton to believe ; I think they are probably a century or two earlier than Zimbabwe.

Mr R. S. Fairbridge, of Umtali, who has an unequalled knowledge of his own district, has written some articles to prove that the ' slave-pits ' were used as tombs, or rather as cenotaphs. The theory is ingenious and deserves examination, but I prefer to regard these curious structures as habitations. Though simpler they are of the same generic class as the dwellings on the Niekerk site. RANDALL MACIVER.

## WINDMILL HILL, WILTSHIRE

The greatest interest has been aroused in archaeological circles by the remarkable discoveries on Windmill Hill, near Avebury. Here the owners, Mr and Mrs Keiller, have been carrying out excavations for two seasons, with the assistance of Mr St. George Gray. The site was inhabited at a very early date in the prehistoric period ; and the triple concentric ditches there, broken as they are by frequent causeways, have analogies in the Middle Rhine region. Mr Keiller allows the following forecast of his plans to be published. In 1927 digging will be carried out between 26 April and 28 May. Visitors will be allowed to visit the excavations on Saturday afternoons. The following year will be devoted to tabulating the results of the past three years' work, and to writing the first volume of the published account of the excavations. It is proposed to continue this method of publication every three or four years, and full arrangements have been made for the work to be carried on in the event of the death of any of the principals or any of the permanent staff. It is proposed thoroughly to excavate the entire site and any adjacent ground which might tend to throw light upon that site ; but a certain portion of each distinctive part of the site will be left unexcavated and provision will be made for leaving these portions unexcavated for at least one century. Mr Keiller continues :—" This unusual arrangement is prompted by my realization of the inestimable advantage that it would have been to us of these days, had earlier excavators pursued this policy ; since it is merely futile to assume that future generations will not have further comparative data upon which to work, which will enable them doubtless to obtain more information from the excavation of a site than lies

within our power to-day. It will, moreover, give a future generation of archaeologists an opportunity of satisfying themselves that the reports of our work were reliable and accurate."

With regard to the excavations themselves Mr Keiller says :— " The first year's work (1925) consisted of certain trial excavations of typical portions representing different features, *e.g.*, Inner, Middle and Outer Ditch, and certain of the holes within the area. Last year we began upon the more definite line which would in future be followed, namely, excavating from causeway to causeway in any section which was undertaken. The next year's work (1927) will be the continuation of the first year's work upon the lines of the second year's work, that is to say, those sections in which diggings were made the first year will be completely excavated this year from causeway to causeway in each case, and the causeways themselves will be exposed."

Archaeologists will follow the work on this most important site with the greatest interest.

## FLINTS AND " FOOD-GATHERERS "

Considerable success has attended the second year's excavations at Lower Halstow, near the mouth of the Medway, in Kent, of a series of Stone Age hearths ; and it is now possible to group the finds as follows :—

(1) Types resembling forms of the Upper Palaeolithic period, including the graver.
(2) Microliths and quasi-microliths.
(3) Picks, pick-planes, axes, adzes and tranchets.

The adze is by far the most numerously represented.

A parallel industry may be cited as occurring on the west coast of Norway between Bergen and Trondhjem. The artifacts there recovered fall under the same grouping as set out above. The graver which occurs plentifully is not represented in the Shell Mounds of Denmark. Typologically, the Norwegian coastal industry is anterior to that of the Kitchen Midden period of Denmark ; and geological evidence establishes the fact that these Norwegian sites were flourishing contemporaneously with the Magdalenian phase of Central Europe.

If the typological classification of the Upper Palaeolithic and Azilian-Tardenoisian cultures of Central Europe is correct, and if the Norwegian geological evidence is sound, then it is abundantly clear that the industries located on the Norwegian coastal sites and at Lower Halstow must be widely separated in point of time. J. P. T. BURCHELL.

## THE HUELVA HOARD (SPAIN)

This hoard, found in 1923 at the mouth of the Rio Tinto in Andalusia, is of capital importance for chronology of the British Bronze Age. It consisted of bronze swords, spearheads, arrowheads, fibulae and miscellaneous objects. Several of the swords belong to a type common in NW. Europe, and represented in England. The hilt is quite distinctive and is noticed at once when it occurs in English hoards, for it differs in many respects from the commoner types. The blade has a pronounced midrib, and narrows gradually to a fine point; it was intended for thrusting rather than cutting. Examples (represented by the hilt only) have been found in England at Beachy Head, Sussex; Cumberlow Green, Herts.; Minster, Kent; and from the Thames at Twickenham. In the British Museum are examples from the Seine at Paris; the Boulogne, near Nantes; the Loire, near Nantes; and there is one also from Almeria, in SE. Spain.

The Huelva blades with a tang and rivets may be matched by English finds from the Thames at Twickenham (*Bronze Age Guide*, plate 2, fig. 7); from the Ouse near Ely (*ib. id.* fig. 11); and from the Langrove hoard (*Archaeologia*, lxxi, plate 12, fig. 3). The type is more common in France.

Amongst the spear heads from Huelva occur some with openings in the blade. This type is well represented here, but also occurs in Northern France.

Lastly, there are arrowheads. The only example of a British Bronze Age arrowhead is that found in the Langrove hoard, where also occurred a square-socketed axe, which was either imported from France or strongly influenced by the well-known French type.

The inference is clear; at the period represented by the Huelva hoard, 'influences' from the south reached as far as England and Wales. One might go further and infer that such 'influences' consisted of sea-borne trade; and one might speak of a Western European region that was loosely united by the bond of trade, perhaps also by some community of culture.

But some of the Huelva bronzes point eastwards. A sword with a bronze pommel is a Balearic type; and, far more important, some fibulae—the first of the kind found in Spain—are of the same type as those found at Casibile in Sicily. These can be dated there to between 1200 and 1000 B.C. Unless therefore the British and French types represented at Huelva had a long life in those countries, during which

they remained absolutely unchanged—and this seems unlikely—we are enabled to date them in Britain, also the objects associated with them, to the period 1200–1000 B.C. Since in the Cumberlow hoard and at Beachy Head there were found winged axes, the date of these will have to be put much earlier than has previously been supposed. A full consideration of this important problem, however, would be out of place here.

Professor Bosch Gimpera has discussed the bearings of the Huelva hoard very fully in the *Butlleti*, to which readers are referred. It is clear that Andalusia was a region whose trade extended eastwards for an unknown distance, but (for other reasons) almost certainly as far as the Balearic Isles and Sardinia ; and northwards as far as France and probably England and Wales. The trade with Britain need not have been direct ; indeed the celt from Langrove suggests indirect trade via Brittany. Huelva is only 50 miles from the mouth of the Guadalquivir, in the neighbourhood of which stood Tartessus. This great emporium was founded by the Phoenicians somewhere between 1100 and 1000 B.C. ; but one is justified in assuming, as a working hypothesis at any rate, that it was already in existence then, and that it formed an entrepot for the trade of the west. Several centuries later we know (from Avienus) that the merchants of Tartessus were accustomed to trade with the Oestrymnides, which lay somewhere on the north-west coast of the Atlantic ; and trade is apt to be conservative. Huelva is an obvious outlet for the copper-mining district of the Sierra Morena ; and it would be bound to be used in the Bronze Age. We shall return to this subject later, in dealing with the problem of the glass beads found in British barrows.

Meanwhile further information may be obtained from Professor Bosch Gimpera's article " Huelva," in Ebert's *Reallexikon der Vorgeschichte*, which is illustrated by a full-page half-tone plate ; the same writer's review of the original accounts in *Butlleti de L'Associacio Catalana d'Antropologia, Etnologia, Preistoria*, vol. ii, fasc. ii (1924), pp. 223–6 ; and the original accounts themselves published in the *Boletin de la R. Academia de la Historia*, vol. lxxxiii, 1923, pp. 89–91 (three plates), and in *Actas y Memorias de la Sociedad Espanola de Antropologia, Etnologia y Prehistoria*, vol. ii, 1923, pp. 37–40 (three figures). A short account by J. Albelda is published in *Revue Archéologique*, vol. xviii, 1923, pp. 222–6 (with rather inadequate line-drawings ; this reference is given incorrectly as vol. xvii by Professor Bosch Gimpera).

# Forthcoming Excavations

The following information has kindly been sent by those who have been carrying out excavations this year. The Editor wishes to thank those correspondents who have supplied it, and regrets that some of the replies were received too late for inclusion.

## DURRINGTON

Mr and Mrs B. H. Cunnington will resume excavations at this site during the first week in June, and hope it will be possible to finish this year. The account of the first year's excavations is given on pp. 92–5 of this number.

## RICHBOROUGH

The excavations undertaken here by the Society of Antiquaries will be continued during August and September. They are directed by Major Bushe Fox, H.M. Inspector of Ancient Monuments for England.

## RIBCHESTER

Excavations will be carried out here from about 21 March to 16 April, by Professor Donald Atkinson.

## BENWELL

The North of England Excavations Committee hope to continue excavations on the Roman Wall at Benwell in the autumn. Mr J. A. Petch, M.A. will be in charge, as in 1926. Attention will be directed to the suburbs of the fort, since little is known of the details and information relating to Roman Benwell is required for the new county History of Northumberland (vol. XIII), now in process of compilation. Mr Petch will give an account of last season's work at the monthly meeting of the Society of Antiquaries of Newcastle-on-Tyne, to be held on 13 March 1927, in the Black Gate Library, Newcastle.

## ALCHESTER

Work will probably be resumed on this site this year, but exact details are not yet forthcoming.

## ST. CATHERINE'S HILL, WINCHESTER

It is probable that excavation on this site will be resumed this summer by some of the Old Wykehamists, in co-operation with the Hampshire Field Club.

## CAERLEON

The following programme of work on the site of the Roman legionary fortress, has been planned for the coming season. The excavation of the amphitheatre will be continued by Dr R. E. M. Wheeler, in conjunction with the National Museum of Wales. Funds for the excavation have been supplied by the *Daily Mail*. When completely cleared, the amphitheatre will be handed over to H.M. Office of Works for permanent preservation. Excavations will be begun in a large field of four acres, situated in the *retentura* of the fortress, and including the west corner of the fortress. The work will be spread over two seasons ; the present season will be devoted to a systematic clearing of half of the field, and a detailed investigation of the fortress defences, including the stone wall with its internal earthen ramp and external ditch-system. The Caerleon Excavation Committee has invited Mr Nash-Williams, Keeper of Archaeology in the National Museum of Wales, to direct this work.

Excavation in both cases will probably begin in July.

## WROXETER

What will probably be the last season's work on this site will be carried out between June and September, under the direction of Professor Donald Atkinson, of Manchester University. It is hoped to finish uncovering the Forum.

## WINDMILL HILL, AVEBURY

A note on this season's programme will be found on page 104.

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The Editor will welcome information about forthcoming excavations for insertion in the June number of ANTIQUITY.

It is hoped that such notes as these may be found useful by excavators themselves, as well as by the general public.

# Reviews

THE REGIONAL BALANCE OF RACIAL EVOLUTION being the Presidential Address of Professor H. J. FLEURE, D.SC., delivered to Section H of the British Association at the Oxford meeting, August 1926.

Presidential addresses are immune from criticism on the occasion of their delivery. How long this immunity lasts we do not know, but let it be said at once that Professor Fleure's address has an innate immunity. It is a brilliant attempt to outline an evolutionary rather than a taxonomic survey of the races of Man ; it abounds with stimulating suggestions ; and it reveals the author as one of those rare men whose power of generalization is not atrophied by specialism. Great generalizers are not uncommon, and all men of science are specialists ; but too often the one is ignorant of his facts while the other can see nothing else. Professor Fleure can see both the wood and the trees at the same time.

The address is written in clear, terse English and a summary is impossible, for it is itself a summary. Perhaps a few quotations may give the best idea of it. For instance, ' Human society does not so much result from the coming together of individuals as human individuality results from the liberation, bit by bit, of individual initiative within groups.'

Professor Fleure refers to the suggestion of Professor Menghin that the Grimaldi type (late palaeolithic) of man ' is to be linked with the rock-face art of Alpera and other places in East and South-east Spain.' An African origin has been suggested for both, and there are very good reasons for accepting this explanation, first put forward many years ago by Professor Sollas (*Ancient Hunters*), for the paintings bear an extraordinary resemblance to the Bushmen paintings of South Africa, while there are negroid characters in the Grimaldi skeletons. Further, rock paintings occur throughout the North of Africa (in the Sahara at Ouenat and in the Sudan at Gebel Moya and Gebel Sagadi, for instance) and some of these may well be of extreme antiquity. ' At that (pleistocene) period, we may take it that the requisite climatic conditions obtained in various parts of the belt now forming the Sahara and South-west Asia, for the belts of climate then lay further south, and the winter westerlies apparently visited that belt ; it is interesting that the Sahara shows a good deal of evidence of inhabitants of possibly mid-pleistocene date. We may, perhaps, venture to place the ancestors of modern man in the zone from the Atlantic edge of the Sahara to Persia.'

With regard to the question of later survivals of the Cro-Magnon type, it may be mentioned here that in the Zaghreb (Agram) Museum is a fine series of apparently neolithic skulls with what the present writer thought, when he saw them, to be Cro-Magnon affinities. They have never been published.

Professor Fleure suggests that ' the probable early home of grain was in some part of the Fertile Crescent around the north end of the Arabian desert, and food production was already undertaken there, e.g. at Susa, about or before 5000 B.C.' Somewhere in the same region is to be placed the rise of a culture complex, which included the invention of metallurgy. Some elements of this culture may have spread to Western Europe during the fourth millennium ; but ' there is . . . no need to picture the awakening West as copying exactly from one and distant civilizations. One will be nearer the truth if one thinks of the incoming of a germinating influence.' This is an admirable expression of opinions founded upon fact, not fancy. The key to European prehistory is to be found in local evolution of culture, occasionally modified by influences coming from without.

LEGENDS OF THE FENLAND PEOPLE. By CHRISTOPHER MARLOWE. Cecil Palmer. 7s. 6d.

Archaeologists and historians are no longer sceptical of the value of folk-lore as ancillary to their studies. Genuine folk tradition, analysed with critical care, may contain and reveal valuable kernels of truth, and the garnering of such material in Britain is an urgent need. The book here reviewed can, however, hardly be regarded as providing anything of value in this respect. Practically no details of the sources whence the stories are derived are given save in the case of those numbered 7 and 8—Sir Hugh and the Dragon, and the Story of Bricstan of Chatteris. For the basis of these the author expresses his indebtedness to the author of a book on Horncastle folk-lore. The word " basis " gives us the clue ; the stories are literary renderings of folk tales added to or modified as art dictates ; and their interest lies therefore mainly in their literary quality. On the merit of the book from this point of view the present reviewer offers no opinion. Those who are curious in such matters may compare chapter v, " Hereward the Saxon," with parallel passages in Kingsley's *Hereward the Wake*. It may be noted that in the foreword the author refers the transformation of a well-populated country into what is now the Fenland to a " sea-quake " which occurred during the consulship of Valentinian. There is no index. CYRIL FOX.

IMMORTAL MAN. By C. E. VULLIAMY. Methuen & Co. 6s.

The subject of this book is the belief in the Immortality of Man. The author traces that belief in the evidence afforded by prehistoric burials, and examines our own attitude towards the problem of survival. He expressly states that he has no wish to present any theory of his own.

The book contains a compendious account of burial customs ; the author ranges widely, gathering in archaeological and ethnological evidence, and the material thus collected, if well indexed, would prove useful to archaeologists in search of parallels to the varied and curious phenomena of burial which, if they be barrow diggers, they are certain to have found. The index is however entirely inadequate. Why so many authors of serious works are content to allow this important part of their book to be neglected is a mystery. The answer in the present case, doubtless, is that the book is meant for the general reader. The style of the writing is exact and lucid, the attitude of mind detached and at times ironic. CYRIL FOX.

ENGLAND IN TUDOR TIMES. By L. F. Salzmann, M.A., F.S.A. London : B. T. Batsford, Ltd. 1926. 8vo, pp. 143 and 67 plates. 7s. 6d.

This interesting account of the social life and industries of Tudor England will be found very useful by students of that period—the numerous extracts from contemporary writers adding to its value. The five chapters deal with the spirit of the Tudor age, life in the country, life in the town, life in the home, the Church, and adventures on land and sea. The author's style is good and makes easy reading, while the printer has reason to be pleased with his work. R. C. C. Clay.

A GUIDE TO THE ROMAN WALL. By R. G. Collingwood, M.A., F.S.A. Andrew Reid and Co., Ltd., Akenside Hill, Newcastle-upon-Tyne. 1926. 6d.

For the modest sum of sixpence may be obtained a handbook of about twelve thousand words, three plans of forts and a small sketch-map of the north of England in Roman times—all from the hand of a first-rate authority. The information supplied is practical and lucidly expressed. It will certainly be found to " give the visitor all he need know in a shape that will not burden anyone's pocket or knapsack " ; and we commend it to all such as being indispensable.

THE TWILIGHT OF HISTORY. By D. G. Hogarth [The 8th Earl Grey Memorial Lecture, delivered 17 February 1926]. Oxford University Press. 1926. 1s.

Dr Hogarth enunciates an important principle. " The history of humanity from first to last shows the index of civilization not to be art. The acme of art production has always been attained during political stages of autocracy or of limited aristocracy, which precede the acme of general well-being . . . Art declines in quality when it ceases to be the main concern of a dominant class, but civilization will still broaden and grow, because society enfranchised on a wider basis substitutes for art-interest a concern for the conquest of mechanical force." We must not, for example, make the mistake that Ruskin made, when he confused art and ethics. Neither bad painting nor ugly pottery imply social decadence ; indeed inference from one to the other is most hazardous. Dr Hogarth attributes the decay of Cretan art to the overthrow, soon after 1400 B.C., of the old Cnossian Dynasty by Minos, the probable founder of the late Minoan Dynasty, which was Achaean.

But surely he overstates his case against ' pre-history ' when he says that " it is no more than subjective guessing at the causes of surviving products of human activities . . ."? That there is a surfeit of guessing we know, and deplore ; but so sweeping a condemnation is stultified by Dr Hogarth's own work, including this brilliant little essay.

THE GREEKS IN SPAIN. By Rhys Carpenter, Professor of Classical Archaeology in Bryn Mawr College, Pennsylvania. [Bryn Mawr Notes and Monographs, no. 6. Bryn Mawr College, and Longmans, Green and Co., 1925].

This little book is a model which might be copied with advantage in Europe. The author combines scholarship with archaeology and he has the sure touch of the art critic. His style is irreproachable, and it is a pleasure to read his lucid account of an abstruse subject. The book consists of 116 pages of narrative and 64 of appendices, including

references, a short but excellent classical bibliography, and a chronological table. There are two useful maps and 25 photographs, some of them indifferently reproduced.

Although, like all students of Spanish archaeology, Professor Carpenter is indebted to the researches of Schulten and Bosch Gimpera, and says so, he claims to have produced a connected account of Greek activities in Spain. There was need of such. (His bibliography contains a bare half dozen articles dealing with the same subject, and they are rather inaccessible). To have done so is in itself an achievement for which he deserves the thanks of all. His other claims entitle him to rank as an original investigator, and prove that it is possible for the right sort of specialist to produce good and valuable work without becoming unintelligible.

ANNUAL REPORT OF THE ARCHAEOLOGICAL SURVEY OF INDIA, 1923-4. Edited by SIR JOHN MARSHALL, Director-General of Archaeology in India. [European agent—the Office of the High Commissioner for India, 42 Grosvenor Gardens, London, S.W. 1]. 1926.

By far the most interesting part of this Report is that which deals with the excavation of the Indo-Sumerian sites of Mohenjo-Daro and Harappa. Sir John Marshall is justifiably proud of these epoch-making discoveries which, as he says, at a single bound take us back to a period some 3000 years earlier than any that was previously known to exist in India. They establish the fact that, at least as long as 5000 years ago, " the peoples of the Punjab and Sind were living in well-built cities and were in possession of a relatively mature culture with a high standard of art and craftsmanship and a developed system of pictographic writing."

Harappa is in the Montgomery District of the Punjab on the river Ravi, 150 miles south-west of Amritsar. Mohenjo-Daro is in the Larkana District of Sind, about 150 miles north of Hyderabad and about 200 miles north-west of Karachi. Both sides lie in the plains of the Indus, though they are as far apart as London and Aberdeen. It would be morally certain that others like them existed, were we not informed otherwise by the same authority that they abound, especially " along the banks of the dried-up beds of the main stream and its estuaries, not only in Sind but in Bahawalpur State and the Punjab." It is therefore more regrettable to read throughout the Report of the financial stringency which has hitherto impeded excavation. The discoveries rank with those of Rawlinson, Schliemann and Evans ; and the whole world is impatiently waiting for news of a kind which only the spade can release.

Though the sites are to be classed as recent discoveries the characteristic seals bearing the effigy of a bull and with inscriptions in an unknown pictographic script had long been known. " More than half a century ago some specimens of these seals were obtained by Sir Alexander Cunningham and published in his Report for 1875 (vol. v, p. 108, and plate xxxiii, fig. 1). Other specimens were subsequently acquired by the British Museum and published by Dr J. F. Fleet in the Journal of the Royal Asiatic Society for 1912. They should, therefore, have been well-known to orientalists, and must have been constantly seen by Mesopotamian experts in the British Museum." Not one single individual, however, appreciated their significance. It is hardly surprising therefore that, when more finds came to light, Sir John Marshall should have turned, not to recognized seats of learning, but to the *Illustrated London News*, " in the hope that, through the medium of that widely read journal I might succeed in getting some light thrown on their age and character by archaeologists in other countries. This

hope, I am glad to say, was at once fulfilled. In the following issue of the *Illustrated London News* appeared a letter from Professor Sayce pointing out the close resemblance between these objects from the Indus Valley, and certain Sumerian antiquities from southern Mesopotamia ; and a week later appeared in the same journal a longer article from the pens of Messrs. Gadd and Sidney Smith giving a more detailed comparison of the pictographic scripts and other antiquities found in the two countries." The result showed that " the Punjab and Sind antiquities are closely connected and roughly contemporary with the Sumerian antiquities of Mesopotamia dating from the 3rd or 4th millennium before Christ."

Sir John Marshall is most wisely proceeding slowly and has postponed detailed publication of results " until the excavations have progressed further and we can feel our way with relative certainty in this new and unexplored field." A fuller and detailed report is promised after the season 1925-6. It is good news that a British archaeologist with experience in Mesopotamia, Mr Mackay, went to India last year to help in the excavation of these ' Indo-Sumerian ' sites.

The association of great rivers and ancient civilizations is a well-known fact. Hitherto the Indus has been an exception. Now that here too the expected evidence has been found we may hopefully look to the valleys of the other great rivers of the World ; what has the Ganges in store, and the great rivers of Further India and China ?

THE STONE AGE IN RHODESIA. By Neville Jones. Oxford University Press, 1926. 120 pages, 40 illustrations. 12s. 6d.

The problem of prehistoric Africa and the correlation of its cultures with those of Western Europe in palaeolithic times has long intrigued prehistorians ; so also has the question, " is Africa to be considered as a cradle or a museum of many of our early cultures ? "

In the present volume the author's intentions are modest ; but he is to be congratulated on a notable piece of work. He is not intending to deal with the prehistory of Africa, or even to enunciate strange theories : he describes industries and sites in Southern Rhodesia—for the most part studied by himself personally. Evidence of every kind—deduced from stratigraphy, typology, state of preservation of the objects, etc.—is collected and clearly tabulated, with the result that the reader accepts readily the statements made. In the latter part of the book the Bushman race and art come under review and here too is shown a clear grasp of details and their importance.

After a foreword by Sir Arthur Keith and an introduction to the subject with accounts of previous work, there are two short chapters on the Geological and Archaeological classifications used. In the latter a table of West European palaeolithic cultures is given and later a probable correlation with South African industries. One is perhaps a little sceptical of this attempt to correlate our upper palaeolithic, culture by culture, with African equivalents. It is a legacy from the past when prehistorians seem to have assumed that Western European cultures were necessarily world-wide in their distribution. The introduction of Solutreans—essentially a small north European culture—under the hideous designation Solutric (not an invention, of course, of our author) is surely a pity ? A technique in flint-knapping somewhat resembling that used by the Solutreans (and indeed by other unconnected folk in other periods) in Europe may occur in South Africa, but why therefore must the Solutrean culture itself be dragged so far south from its probable cradle in Hungary ? No, both Europe and large parts of Africa were at one time peopled by upper palaeolithic (neoanthropic) folk, but there were

rapid developments on different lines in various areas. Even in Europe different developments are not all quite similar !

A chapter on the evidence of human fossils follows, and then an account of the lower palaeolithic cultures which is exceedingly interesting. Here much geological evidence is brought forward. Two series of gravels are demonstrated, the older containing rough (Chellean) tools, the later, fine implements recalling our Acheulean. The author, by the way, disagrees with Codrington and considers the Victoria Falls coups-de-poing as of the same age as the gravels containing them. The existence of a Mousterian industry at Taungs in another gravel of slightly later date than those mentioned above is also stated. Taungs, however, is of course outside the area under review. Most of the upper palaeolithic industries are surface finds and they are not much discussed. The account of the Bushman art is largely descriptive, but the fact is noted that whereas further south a more developed art with complicated scenes is depicted, the more northern examples in southern Rhodesia are simpler without elaborate scenes. A careful study of the superposition of techniques in certain Bushman painted caves (as can be clearly seen in Miss Tongue's well-known book) reveals several distinct ages, for the sequence of the techniques is always the same. Comparisons with the Rhodesian Bushman drawings on these lines might lead to interesting results. The author agrees with the opinion that the Bushman culture is to be connected with the same basal culture which spread over Western Europe at the beginning of upper palaeolithic times. Like environment, etc., may produce similar, though unconnected, industries, as it produces, to a large extent, similar needs. But environment can have little influence in the formation of an art technique, and the Bushman art and that found in rock shelters of late palaeolithic date in eastern Spain are too similar for the fact to be a mere coincidence.

" The Stone Age in Rhodesia " fills a real gap. The author has collected many facts within his area : as he himself says it will be for a later generation of prehistorians to generalize when all the information from other districts has been similarly published.

M. C. Burkitt.

OUR EARLY ANCESTORS. By M. C. Burkitt, M.A., F.S.A., F.G.S. 8vo, pp. xii, 243. Cambridge : at the University Press. 1926. 10s. 6d.

Our increasing knowledge of details of the Mesolithic and Neolithic periods has called for a concise and authoritative textbook on the subject, and for this reason the present volume is opportune. The author intends it to be an introductory textbook for the student without going into " any kind of detail," and it must be confessed that it admirably fulfills its purpose. It deals chiefly with the Mesolithic and Neolithic periods and touches upon the Chalcolithic and Early Bronze Ages. The absence of detail emphasizes the salient facts, and for the first time the student can readily grasp the relative chronology and connexion, and probable origin of the various Mesolithic cultures. The contemporary Azilian and Tardenoisean industries rose from the old Aurignacian stock, as can be seen at the Grotte des Enfants near Mentone where the Aurignacian culture, undisturbed by Magdalenian and Solutrean influences, developed independently into the true Azilio-Tardenoisean. The Asturian and Kitchen Midden cultures, although dissimilar and unrelated, were contemporary and later than the Azilio-Tardenoisean and Maglemosean—the Kitchen Midden being a development from the last. The Campignian is closely connected with the Kitchen Midden but is not allied to the Asturian. The author treats separately of the eastern, northern, western and Mediterranean areas of Neolithic Europe, and describes the characteristics of the peoples, pottery and implements

of each. The infeasibility of the Egyptian theory of the origin of megalithic building is touched upon. As for the Carnac area, it is suggested that the culture there was derived from Crete by way of Spain, and that it was either of Chalcolithic or Early Bronze Age date. Mr. Burkitt devotes a chapter to Art, and shows the similarity of the engravings on the stones of Gavr'inis to those at Sess Kilgreen in Ireland, and the connexion between the stone at Clonfinlough and the Spanish art group III. The effects of climate on the development of culture are dealt with, and stress is rightly laid on the importance of accurate distribution maps. The book can be strongly recommended. It is not too abstruse for the amateur and the serious student will derive much benefit from it. R. C. C. CLAY.

A CENTURY OF EXCAVATION IN THE LAND OF THE PHARAOHS. By JAMES BAIKIE, F.R.A.S. 8vo, pp. 252; plates 32. London: The Religious Tract Society. 1926. 7s. 6d.

At the present day too many of the popular books on archaeology are written with the sole object of airing some crazy misconception. Dr Baikie however has written a popular book giving an outline of the work that has been done for archaeology in Egypt and incidentally he refutes such whimsical theories as that the Pyramids were astronomical observatories or standard measures. He champions the cause of true scientific research and recounts the harm that has befallen archaeology through the cupidity of selfish collectors and ruthless vandals. The book gives in a very readable form the story of the pioneers, hampered as they were by lack of knowledge and the interference of officialdom, and goes on to describe the Pyramids with their sad story of pillage in ancient times. It was the fear of such robbery that impelled the Pharaohs to make their tombs so massive and so intricate, cherishing the hope of a future life similar in detail to that which they enjoyed upon earth. There remain in the different pyramid fields about 70 pyramids of various sizes and forms and constructed with slightly differing degrees of mathematical precision. What is left of the great temples of Karnak, Luxor, Edfu, Dendera, and that of Queen Hatshapsut are witnesses to the skill of those master builders whose edifices were not only beautiful in themselves but also conformed to their surroundings. It was a good day for Egypt and science in general when the Egyptian Exploration Fund began work in 1893 at Der-el-Bahri. Thanks to its labours we have learnt much of the every-day life of the man in the street in ancient Egypt, and consequently more of its history—for history is the story of the ordinary man and not of that of potentates alone, and as Dr Baikie aptly remarks " broken potsherds may mean far more for the reconstruction of history than intact colossi." It was from the IVth to the XIIth Dynasty that the fashion of pyramid building flourished. The tombs of the kings at Abydos had all been previously rifled, but the exquisite bracelets of the Queen of Zer and the other few remaining pieces of jewellery indicate that life even in those times was highly organized. The tombs in the Valley of the Kings have long been known and Strabo mentions 40 of them. Belzoni's discovery of the sepulchre of Sety I was eclipsed by the finding of that of Tutankhamen in 1922 by Lord Carnarvon and Mr Howard Carter. Such wealth and magnificence of grave furniture belonging to a little-known and short-lived monarch makes us wonder what must have been found in some of the tombs of the greater kings by those who were the first to open them. Dr Baikie treats of the unequalled craftmanship of the jewellers, the greatness of the monumental sculptors and the skill of the portrait sculptors. This book should be widely read ; it is well written, and the enthusiasm of the author for his subject is evident in every page. R. C. C. CLAY.

ROMAN SOCIETY IN GAUL IN THE MEROVINGIAN AGE. By Sir Samuel Dill. Macmillan, 1926. 8vo, pp. xiv, 566. 21s. net.

Not only specialized students of ancient history, but a wide circle of readers able to appreciate vivid descriptions of the manners of another age, have been grateful to Sir Samuel Dill for his two books on the social life of the middle and late Roman Empire. No one who had read them is likely to forget them ; the author's gift for painting picturesque and strongly characterized sketches of ancient social life has long given him a place by himself among historical writers ; it is not too much to say that one corner of the mantle of Gibbon rested upon him. When, after his lamented death, it was made known that he had left a third volume, half finished, one hoped for great things ; and these hopes have been more than realized.

The new volume has been edited by Professor C. B. Armstrong, with whom the author had discussed its arrangement and contents, and whom he had asked before his death to prepare the book for publication. It was a task involving much labour, and requiring, as is evident, tact and judgment ; the provision of notes and references to such a work is arduous, and the polishing of an unfinished manuscript by another hand is a task which no one would undertake except as a labour of love. Both tasks have been well done. It is true that there are still roughnesses of style, repetitions of incident, and here and there a judgment, an emphasis, or even a statement of fact which second thoughts might have altered ; but to have smoothed away all these things would have involved robbing the book of just that personal quality which makes it visibly the work of its author.

Of the three volumes, this last is perhaps the most interesting. The subject-matter of the other two is relatively familiar, and the problems with which they deal are relatively simple ; but with this book we plunge into the heart of the question—what process led from the world of the later Roman Empire to that of the Dark Ages ?

From a purely historical point of view, this problem is important just because it is a problem ; a question in which historians ought to be interested just because they do not know the answer. But there is a further reason why this problem is of special interest to the modern world. Of all past historical periods, the Roman Empire is that which most closely resembles our own ; and we are most of us aware that our civilization is exposed to forces which seem bent upon its destruction. Not to wonder what is going to become of us would be less than human ; and to a generation afflicted by this question there is no more valuable study than that of historical analogies and parallels. History never repeats itself ; but its processes may resemble one another so closely that, so long as we duly attend to the features peculiar to each, it is not impossible to argue from one to another, and use Antiquity as a lantern to explore Futurity.

The peculiar value of Sir Samuel Dill's book lies here. Political history in the traditional style is practically useless. It only tells us that the Roman political system collapsed and that the Merovingian system, since we are speaking of Gaul, took its place. Politically, there is no continuity ; there is only a clean cut ; and a clean cut is not history. When we turn to the structure of society, we get an entirely different result. In Merovingian Gaul we find two civilizations existing side by side, differentiated originally at every point ; by the time of Clovis, a certain assimilation has set in ; the older civilization has converted the newer to its own religion, but the distinction of race and social organization is still emphatically asserted. Indeed, the inferiority of the Roman to the Frank in the social scale of values is legally sanctioned. Yet, in spite of

this, the Roman preserves his identity ; his social organization remains intact, and is able by degrees to impose itself on the conquerors to such an extent that from Teutonic Franks they end by becoming Frenchmen. Thus the Frankish invasion, though it swamps the structure of Romanized Gaul beneath a flood of Teutonism, does not disintegrate this structure ; it remains substantially intact, and bides its time to assert itself. This reading of the evidence is inevitable, granted the truth on which the author often insists, that in spite of upheavals, wars, the destruction of wealth, and the fall of ancient families, the old Romano-Gaulish landed estate survived the storm, and pursued a peaceful existence throughout the period of transition.

This is the heart of the problem. The survival of Roman tradition in Gaul, and its triumph over the Teutonic tradition politically superimposed upon it, was a function of the villa system, the landed estate which acted as the trustee for all the ideas of Roman civilization.

The English student has much to learn from this conception with regard to the history of his own country. In Britain, the opposite process took place. The Teutonic invader triumphed over the Roman tradition, not only politically but in language, in religion, and in economic and social organization. Why this happened in Britain, and not in Gaul, is an old problem ; a problem which has driven innumerable historians into positive misstatements of fact ; yet, in the light of the conception so clearly expounded in this book, a problem by no means insoluble.

One historian, misled by a hasty interpretation of Gildas and the Anglo-Saxon Chronicle, fancies that the Saxons blotted out the Romanized Britons by fire and sword. Another, realizing the sheer impossibility of such a military feat, boldly declares that the Saxon conquest never happened at all ; and that we are the Romanized Britons. The truth, as it appears to the present reviewer, is less exciting but more credible than either of these fancies.

The Romanization of Britain was a very real thing. Haverfield, who discovered it, may have exaggerated it in a few points of detail ; but it was a genuine discovery, not a mare's nest. What he did not sufficiently recognize was that it was skin-deep. It affected at first the tribal aristocracies ; and later the whole of that large middle class whose country houses we call Roman villas ; but it never struck its roots deeply into the masses of the population. In the country villages, and perhaps also in the mean streets of the towns, the only Romanization that took place was the acquisition of Roman pottery, coins, and such-like externals of civilization. And even in this restricted sphere, Romanization was far from complete. In countless out-of-the-way villages, it is probable that native fashions persisted unchanged. Thus, it is almost startling to learn that ancient British coins continued to be struck at Hengistbury down to the late second century. By the fourth century, Roman civilization in Britain, with all that it implied in the way of social, economic, political, religious, and linguistic habits, was universal in the upper and middle classes, but had left the lowest classes, and especially the country villages, all but untouched. Now this was exactly the same in Gaul. Sir Samuel Dill quotes more than one anecdote showing that the peasants in out-of-the-way places were in a state of savagery, that is, were not Romanized, by the sixth century. Thus we cannot argue that the failure of Roman civilization in Britain to conquer the Saxons was due to the fact of its being less wide-spread or less deeply rooted than in Gaul.

The clue to the difference seems to lie in the fact that the great disaster of 367, in which the whole country was over-run not by Saxons but the far more destructive Picts,

involved a systematic destruction of villas. It has often been noticed that the life of a Romano-British villa normally goes down to this period and there ends abruptly. But the importance of this fact has, I think, never been observed. With the destruction of the villas, Roman civilization in Britain was destroyed ; for it was the civilization of a class, not that of a homogeneous social organism. The people who remained were significantly called by their conquerors not ' Romans,' as in Gaul, but merely ' Welsh.' The Celtic revival of which Haverfield wrote was not so much a revival of Celticism, as the survival of those lower classes which had never been at all deeply Romanized.

Thus the real destruction of Roman Britain, which was a social and economic affair, not a political, took place in 367 ; and nothing like that ever took place in Gaul. By the time the Imperial government abandoned Britain, there was nothing left worth keeping. Had the landed classes with their villa estates remained intact, Roman civilization would have survived the Roman evacuation in Britain as it did in Gaul, to set its mark on Anglo-Saxon society. Whether that would have been a good thing or a bad thing for the world's happiness, is another matter. But if it was a good thing that Roman civilization, a romance tongue, and the Christian religion, survived in Gaul, it is worth our while to realize that the reason why these things survived was because the social class survived whose property they were. R. G. COLLINGWOOD.

REPORT ON THE EXCAVATION OF THE " A " CEMETERY AT KISH, MESOPOTAMIA. By ERNEST MACKAY. Field Museum of Natural History, Anthropology Memoirs, Vol 1, no. 1. Chicago, 1925. pp. 61, and 20 plates.

The most dramatic sidelights on the life of vanished civilizations and peoples have often been afforded by a study of ancient graves ; and recently discovered tombs of a Norse queen at Oseberg and of Tutankhamen in Egypt are obvious instances in point. For the serious archaeologist the study of cemeteries has another advantage : the funeral gifts interred with a single corpse present the most perfect example of a " closed find " —a group of objects unmistakably in use together at the same epoch. The chronology of predynastic Egypt is based entirely upon a comparison of various types of objects found in association in the many cemeteries excavated in the Nile valley.

Mesopotamia has been sadly neglected in this respect. The earlier excavators were concerned primarily with objects of artistic or epigraphic interest and were apparently entirely unconscious of the meaning of a " closed find." The excavations of the Germans at Assur and of the British Museum at Eridu and Ur marked the first steps towards more scientific methods, but to Mr Mackay of the Oxford and Field Museum Joint Expedition, falls the honour of publishing the first detailed account of a necropolis explored on modern lines.

The thirty-eight tomb groups that he describes naturally do not suffice for the establishment of a comprehensive system of sequence dating such as Sir Flinders Petrie has worked out for Egypt, but their furniture throws a new light on the more every-day arts and crafts of ancient Babylonia and thus provides terms of comparison with barbarous lands to the north and east. The pots, weapons, and ornaments of the common people in Mesopotamia were previously scarcely known. In view of the large claims for Egyptian influence that are being made to-day on the strength of comparisons between grave-goods from the Nile valley and other regions, material of a like order was badly needed for the kindred area of the Tigris-Euphrates valley.

Of course our cemetery, on the dating of its excavators, only takes us back to the period of the Royal Tombs of Naqadeh in Egypt; but behind cemetery "A" lies a long past represented by earlier buildings at the same site, by the painted pottery of Jemdet Nazr and the still earlier wares of Tell el Obeid. When this is remembered, a comparison of the pottery and metal work from Kish with those of Europe, shows that pan-Babylonianism may still be a serious rival to pan-Egyptianism. Let us take a few instances.

The pottery is all made on the wheel, a device not introduced into any part of Europe till a thousand years later, but it has curious analogies with barbaric wares used in various parts of our continent Europe, not to mention India. Almost every grave was furnished with a "brazier," an open dish standing on a high hollow pedestal that is generally perforated. Dishes on a high hollow pedestal also perforated were typical grave-goods at Lengyel in Hungary and recur in many contemporary cemeteries and settlements in the Danube Valley and Transylvania; the so-called "vase-supports" found in megalithic tombs in France and the Channel Islands have a similar structure and again exhibit the curious perforations in the base.

No less general at Kish were large handled jars with a female bust modelled in high relief on the handles. We see the same idea at work on the well-known anthropomorphic vases of Troy and the middle Danube.

The implements and ornaments of copper buried in the graves by the citizens of Kish are peculiarly instructive for the history of metallurgy. The battle-axes bring us near to the origin of the modern shaft-hole type of axe-head. The hole for the shaft was here made simply by bending the butt of the axe back upon itself so as to form a loop. A reminiscence of this method of manufacture may be seen in the imitations of rivet-heads ornamenting the body of an axe from a Copper Age tomb at Tsarevskaya, north of the Caucasus.

At Kish again we meet the earliest examples of the eyelet pin that was destined to become typical of the European Middle Bronze Age. One specimen in which the neck has been hammered out flat bears an engraved pattern almost identical with that found on the round swollen necks of the European pins.

Again the spiral ear-rings with their flattened ends take back an additional thousand years a type familiar to European archaeologists from the hoards of Troy II and the Early Bronze Age graves of Central Europe.

Every student of prehistory will therefore do well to study minutely Mr Mackay's admirable work and will have every reason to be grateful for the prompt publication of his important results. We hope his example will be followed by other excavators. At the same time we may express the wish that the metal objects should be analysed and that the excavator's statement that the daggers and axe blades have been "cut out of sheet copper" should be tested by microscopic examination. V. GORDON CHILDE.

DOWNLAND MAN. By H. J. MASSINGHAM. London: Jonathan Cape. 1926. 8vo, pp. 422. 21s.

One result of the work of General Pitt-Rivers was that archaeology from being a hobby became a science. Now the alpha and omega of science is accuracy: accurate observation, accurate comparison and logical deduction. To jump with insufficient evidence to conclusions indicates that there is a preconceived theory around which must be gathered at all costs some scraps of supporting evidence. This is unscientific and has

been unkindly dubbed feminine; but whereas women are said to jump invariably to the right conclusions by the aid of inherent powers in intuition, Mr Massingham's leaps are usually wide of the mark. A person who thus jumps to conclusions should not complain if, on consulting a doctor for indigestion due to an indiscretion of diet, he has his appendix removed forthwith.

Mr Massingham fights a good fight for the forlorn cause of the Egyptian theory of the origin of megalithic building. His most formidable weapon, for which we must give him full credit, is his undoubted literary ability, and as he wields his able pen he sings a hymn of hate against archaeologists in general, and then rushes in to attack a selected few; but it must be admitted that the views of all those he attacks are not accepted by every prehistorian.

He suggests that the Neolithic was the Bronze Age and the Bronze Age the Neolithic; and after turning this academic somersault he proceeds to stir the whole mass up together into a hotch-potch which he would have us term the archaic or megalithic. He believes that the Bronze Age (whether his or ours he does not say) developed exclusively from the Neolithic and was not influenced from without, and he laughs at those who state that the beaker came from the Rhine. He lays great stress on the fact that beakers have been found with Neolithic pottery. The many examples of this association only go to suggest that the so-called Neolithic pottery was made very late in that period, and many prehistorians at the present day doubt if there was any pottery in Britain much earlier than the beaker. But to return to our book. The author argues that Neolithic man knew bronze and all the other materials which he terms " givers of life " and that they did not use it themselves, but unselfishly acted as miners and collectors for their masters, the Children of the Sun. In the intervals of their labours these simple-hearted slaves rushed from East Anglia, the Mendips, Sussex and other ends of Britain along the high level trackways to participate in the religious and social functions at Avebury. In return they were supplied with corn from the Wiltshire terraces. This corn was apparently stored in the great earthworks of the south when the motor lorry broke an axle or the transport union went on strike. The author ridicules the idea that Yarnborough was a defensive camp. It was not only a granary but also a religious structure, and owes its position to aesthetic reasons alone. Yarnborough has deep ditches, Avebury has a deep ditch: therefore Yarnborough is contemporary with Avebury. Q.E.D. It is all so very simple. He suggests that the shape of some of the long barrows of Wilts and Dorset are " remarkably like an overturned ship." To suggest that they are remarkably like the shape of a small boy after a Christmas dinner would be as illuminating. He complains that archaeologists who have excavated pit villages in Wiltshire have dated them as Early Iron Age because the objects found in them have belonged to that period alone. The author knows that his archaic peoples must have lived somewhere, and " the obvious deduction warranted by plenty of evidence as to the Celtic occupation of sites inhabited centuries before the Celtic day " would lead him to date them all as megalithic.

There are some startling statements in this book. He tells us " I have never seen a single Iberian tool that can quite definitely be called a weapon of war," and that " the diminutive size, careful workmanship and association of flint arrowheads with mortuary remains betray their usage for ornament and ceremony." Has he seen the leaf-shaped flint arrowhead still embedded in a human vertebra which is preserved in the Arles Museum? It was found in the Grotte d'Arnaud near Arles; this is an artificial burial cave, not much if at all later in date than our British long barrows. It is common

knowledge that the weapons of the chase were the weapons of war. Mr Massingham's long barrow at Rainscombe near Martinsell is actually the earthwork of a promontory camp. The statement that three segmented beads came " from Stonehenge itself " is incorrect. It is untrue that " there are just or almost as many sarsens in the Stonehenge district as on the Marlborough Downs," and that " man was not the pawn of geographical conditions " is contrary to general opinion. To argue that because there is a long barrow on King's Play Hill and the slopes of the hill are terraced, therefore the terraces are Neolithic, is to argue that because Salisbury Cathedral is near the gravels on Milford Hill therefore Salisbury Cathedral is early Palaeolithic.

In conclusion we may repeat, in another association, the words of Prof. Elliot Smith in his introduction to the book : " What is most needed at the present time is the elimination of learned nonsense."

R. C. C. CLAY.

PREHISTOIRE DE LA NORVÈGE. By HAAKON SHETELIG, Oslo, 1926. Williams and Norgate, London. 280 pages, illustrations. 7s. 6d.

This excellent book offers an opportunity of studying a country, which generally speaking, archaeologists have neglected. It has been written with the object of linking Norway with the evolution of the other parts of Europe as a whole, and it enables us to gain a clear conception of the development of the prehistory of that country.

We must cease to visualize a cold and barren land, unsuited by Nature to the wants of Man, and one which only found itself inhabited from time to time under compulsion. It has been proved that the west coast of Norway during the last Ice Age remained ice-free, and therefore, was able to offer Palaeolithic man a desirable retreat. Up to the present the earliest definite evidence of man's occupation comes from a series of open-air sites along the coast between Bergen and Trondhjem. These littoral sites have been geologically equated with the Magdalenian period of Central Europe. The industry is considerably older than that of Mullerup in Denmark and consists of forms resembling Upper Palaeolithic types, including the graver ; microliths, picks, axes, adzes and tranchets.

Owing to the scarcity of flint, the primitive Norwegian had to recourse to volcanic rock and schist. This expedient is well illustrated by the celts of the Nöstvet period, an industry peculiar to Norway, and marking the commencement of the Neolithic in that country. It flourished contemporaneously with the Shell Mounds of Denmark. The author continues to trace out, step by step, each succeeding cultural phase, analysing the influences which fostered it, whether spontaneous or suggested from outside. He treats at length of the rock engravings of the " Arctic period," and discusses the difficulties met with in interpreting their origin.

M. Shetelig is of the opinion that the " schist period " which thrived at the end of the Neolithic, was evolved from the epipalaeolithic cultures. It appears that examples of megalithic tombs are sparsely represented in Norway, and only appear at the very end of the Neolithic, whereas Bronze Age tumuli occur in large numbers.

Most types of Bronze Age implements in Norway are based upon foreign models, but that Norway also made use of an independent culture is proved by forms which are wholly confined to that country.

The further one travels northwards the less is stone found to have been replaced by ronze, and it is interesting to note that the Bronze Age influence ends at latitude 68 and that Early Iron Age relics do not occur north of 60 degrees, facts which seem to

indicate that decline in climatic conditions which geologists and meteorologists consider to have set in at the commencement of Early Iron Age times. Iron was not smelted in Norway until quite recently. Hitherto the practice had been to extract it from limonite, of which process the author supplies an interesting account. It appears that the Hallstatt period was soon replaced by that of La Tène.

Evidence is not forthcoming to show that the Romans actually established themselves in Norway, although much Roman pottery glass, jewellery, and the like has been found distributed over a large area of the country. It is known, however, that under Augustus the Roman fleet sailed round Jutland, thus gaining access to the Baltic, where would be found the incentive for a maritime trade via Germany and the mouth of the Rhine. In the fourth century A.D. the links with Rome became severed upon the commencement of the "period of Invasions," and the establishment of Merovingian influence. By the eighth century, this Merovingian power was displaced by that of the Vikings, when contemporary archaeological evidence is corroborated by historical records. Under the Vikings Norwegian art attained its highest quality.

Readers will find that the author is a keen disciple of the school whose slogan is "ex oriente lux;" but although we may be willing to accept it as a fact that from the East emanated many of the developments which benefited the European continent, nevertheless it remains entirely without proof that the Scandinavians contributed nothing to the advancement of Central Europe; yet this is what M. Shetelig would have us believe.

An authoritative book has been produced, and it has been ably demonstrated that the records of the prehistoric peoples of Norway can be made as engrossing as those of other European countries.

J. P. T. BURCHELL.

ETRUSCAN TOMB-PAINTINGS. By FREDERIK POULSEN, translated by Ingeborg Andersen. Oxford University Press, 1922. Small 4to. 63 pages, with 45 half-tone illustrations. 15s.

An extremely useful introduction to a subject which is very little known and deserves far more study than it has generally received. The frescoes in Etruscan tombs constitute an important part of our small heritage of ancient painting, and have a certain value also for the information that they give us as to the life of the people. This information however is somewhat curtailed in its range by the circumstance that the subjects and their composition are entirely dominated by Greek influence. Practically no Etruscan painting is earlier than the sixth century. It is the direct outcome of the study of Corinthian and attic vases, carried out sometimes by native artists but sometimes actually by immigrant Greeks.

Professor Poulsen is an admirable guide through the intricacies of this hybrid art and brings out its double interest, on the one side for the student of Etruscan archaeology, and on the other for the Hellenist who may see in it an enlargement of his own field. It is the first systematic treatment of the subject that has ever been undertaken and will remain a valuable handbook even when such comprehensive works as Weege's *Etruskische Malerei* have supplied a more complete series of copies on a more luxurious scale. In Professor Poulsen's book the illustrations are principally taken from facsimiles and drawings collected towards the end of the nineteenth century in the Ny Carlsberg Glyptothek at Copenhagen. These were executed for Carl Jacobsen by Italian painters, who produced for him a series of copies far superior in quality and accuracy to certain

others that have been made for the museums of the Vatican and of Florence. They are not of course, as the author fully recognizes, completely satisfactory, but they supply an admirable basis for introductory study. The author has selected the most characteristic scenes and has treated them in chronological order beginning with the Tomba Campana at Veii, and concluding with the Tomba del Tifone of Corneto. The several periods are carefully distinguished and the extent and character of the Greek influence in each of them are discussed with judgment and balance. Throughout there is an admirable self-restraint in the treatment of all hypothetical questions as to religion and custom ; a broad sanity which is very welcome in a field where the temptations to fancifulness are numerous.

Modestly addressed in the first instance to University students at lecture-courses, this book deserves to be read and mastered by a far wider public.

D. RANDALL MACIVER.

THE UPPER PALAEOLITHIC AGE IN BRITAIN. By D. A. E. GARROD. Oxford University Press. 211 pages, illustrated. 12s. 6d.

The production of this book fulfils one of the many obligations still outstanding to British archaeology. It constitutes a summary of Upper Palaeolithic finds made in Britain from 1823 when Buckland first dug in Paviland Cave, Wales, until Mr Leslie Armstrong's excavations at Creswell Crags, Derbyshire, which are now in progress.

The subject matter is divided into three parts :—

(1) Upper Palaeolithic Cave sites,
(2) Open-air sites referable to the Upper Palaeolithic,
(3) The Epi-palaeolithic period.

The summary and conclusions do not however do justice to the knowledge the author possesses on the subject. Students of archaeology have every reason to thank Miss Garrod for the pains she has taken in collecting the facts, whilst to those who wish to study in detail the Upper Palaeolithic period of Britain, the bibliography at the end of the volume is indispensable.

J. P. T. BURCHELL.

CARVED ORNAMENT FROM IRISH MONUMENTS. By H. S. CRAWFORD, with a preface by R. A. S. MACALISTER. Published by the Royal Society of Antiquaries of Ireland, Dublin.

The student who is working on the reconstruction of any phase of the early history of the British Isles with the aid of archaeological material is much hampered by the lack of books in which the data bearing on a given problem are collected and systematized. Some day, we may hope, a School of British Archaeology will be founded and endowed, and one of its functions should be the systematic subject indexing of the vast and scattered literature of archaeology in Britain.

Much of the material existing in these islands is, however inadequately recorded, requiring close study in the field before it can be made available for students, and no better service can be done by any archaeologist to-day than by photographing, analysing and placing on record fully and scientifically such material. Irish sculpture of the early Christian period comes within this category, and Mr H. S. Crawford, who has examined the monuments in the field, and placed the results of his research on record in the book under review is to be congratulated on an admirable piece of work.

Professor Macalister in his preface justly remarks that the richness of Irish ornament in MS. illumination was a familiar commonplace, but that the literary sources of information available to the student give little indication of the wealth of Ireland in the analogous sculptured art, and only analysis of the designs, panel by panel, could give the needed picture.

The full title, " The Handbook of Carved Ornament from Irish Monuments of the Christian period," exactly indicates its character. It illustrates and classifies the various types of design found on such monuments, which date from the ninth to the eleventh centuries. There are fifty-two half-tone plates, fifteen of which are of crosses or large fragments of crosses. The other plates show the range of the ornament found on the monuments. They are all photographs, either from the originals or, where the surface colour of the original is so varied as to make the elucidation of design with the aid of photography impossible, from good casts. A feature specially to be commended is the presentation of each design twice over—on the left hand page the untouched photograph, on the right the design restored as far as may be ; we thus have " the present state of the carving and its original appearance as inferred from a careful study." The student has the best of both worlds ; from the one illustration he can draw his own deductions, the other gives him the benefit of Mr Crawford's close and fruitful study of the art of the monuments. If in some cases it is apparent that the restoration gives more detail than can be read into the untouched photograph, the author has a perfectly sound answer ready ; portions of the same design on parts of a given monument can be studied and utilized for a reconstruction, while the photograph only reproduces one limited portion of the design. The designs illustrated are classified into Abstract and Biomorphic, the former including spiral, star, interlaced and fret patterns, the latter animal, human and symbolic forms. The author's aims are strictly limited ; no attempt is made to provide theories as to the origins of the patterns, and archaeological parallels are sparingly quoted.

Spiral patterns in particular have a long history behind them, and the revivification and development of this pagan motif in Christian times is one of the most interesting facts in the history of European ornament. The extraordinary elaboration of which the motif is capable is well seen on plate XVIII. The remarkable power of forming intricate and symmetrical decoration possessed by the pagan Celts, but only brought to full fruition in Ireland under the influence of Christianity, is indeed apparent in every illustration in the book.

Students of Anglian and Scandinavian art will find much new material of familiar type in the Zoomorphic group of patterns, e.g., figs. 84, 89, 90, 94, 158 ; but there is also much which reveals the originality and ingenuity of the Irish craftsman. The curious variety of art motives which drifted into Ireland during the period under review is well illustrated by the symbolic designs, many of which are derived from the Bestiaries. The majority of the human forms are poorly rendered ; a panel from the North Cross, Ahenny, is an interesting exception, representing a chariot and horsemen. It is probable that chariot warfare survived later in Ireland than any other part of Europe. The progress across Europe from east to west of this mode of warfare, and its suppression in favour of cavalry tactics as successive peoples (again from east to west) secured the much-desired larger breed of horse forms one of the most interesting features of the protohistoric period of Europe.

The strength of the La Tène art of the Early Iron Age lies in its power of abstract

design ; its weakness in its delineation of human and animal forms. Precisely the same strength and weakness are shown in the art, seven hundred to a thousand years later, produced in the only Celtic-speaking area which did not come under Roman influence. This similarity suggests that the conquest of the island by Celtic speaking peoples from the continent represented a strong infusion of new blood and not merely the intrusion of warriors few in number, who became a dominant aristocracy. Space will not permit us further to discuss the problems suggested by the examination of this fascinating volume. No archaeologist engaged in comparative work in this country can afford to be without it, and the members of the Royal Society of Antiquaries of Ireland by whose subscriptions publication was made possible, are to be congratulated. Should a second edition be called for, the author should include a map of Ireland, showing the distribution of the monuments. CYRIL FOX.

A CENTURY OF EXCAVATION IN PALESTINE. By PROFESSOR R. A. MACALISTER. London : The Religious Tract Society. 1926. 8vo, pp. 335 and 36 plates. 10s. 6d.

The author divides this book into five chapters—A sketch of the history of excavation in Palestine, excavation and topography, excavation and political history, excavation and cultural history, and excavation and religious history—with a useful bibliography at the end.

As long ago as A.D. 326 Queen Helena excavated in order to find the Holy Sepulchre, but it was not till about 1860 that modern excavation began, although from the sixteenth to the nineteenth centuries various travellers left us more or less useful accounts of their journeys. The Palestine Exploration Fund was inaugurated in 1865, and one of its first tasks was the great survey of Palestine by Conder and Kitchener. Later on work was carried out by American, French, German, Austrian and, since the war, Jewish societies. The author describes the formations of *tells*, or the mounds that conceal the remains of ancient cities, and the *khirbehs* or visible ruins dating as a rule from a period not earlier than the Roman. The pre-Jebusite or Canaanite culture was far superior in every way to the subsequent Hebrew—a culture that in spite of its literary attainments was deficient in inscriptions and artistic work in general. The Philistines however under a strong Aegean influence later raised the cultural status of the Jews. The former were the " People of the Sea " who were so decisively beaten by Ramessu III (1198–1167), and who on being driven back from the shores of Egypt settled on the seaboard of Palestine. " It might almost be thought " says Professor Macalister, " in a superficial view of the excavations that the excavator and the historian were working in totally different fields ; " for there have been no traces of the kings of Israel who loomed so large in the pages of the Old Testament. There is evidence of human habitation in Palestine during all the Palaeolithic periods with the exception of the Solutrean. The author does not agree with de Morgan's theory that the Neolithic period was totally absent in western Asia. The Bronze Age which differed in many details with that found in Europe gave place to the Iron Age at about the time of David, or roughly 1000 B.C. Engravings on the crust of flint scrapers are sometimes found, but the tranchet is unknown except for the cache at Gezer, and arrowheads are usually of the leaf-shaped variety. The fact that one at least of the standing stones at Gezer is of a kind foreign to the neighbourhood recalls the Blue Stones at Stonehenge. Cupola or cup markings on stones are common to sites of all periods in Palestine, but as elsewhere their purpose is unknown. " Its

(Palestine's) entire culture was derivative. Babylon, Egypt, Crete, Rome, each in turn, lends its helping hand ; never is it stimulated to make an effort for itself." The difference between the pilgrim of former days and the modern tourist is shown in the following passage : " The pilgrim was guided by an ecclesiastic who had renounced the world (at least in theory) ; the tourist is guided by a dragoman who renounces nothing that he can lay his hands on." R. C. C. CLAY.

EVERYDAY LIFE IN ANGLO-SAXON, VIKING AND NORMAN TIMES. By M. AND C. H. B. QUENNELL. London : B. T. Batsford, Ltd. 1926. 8vo, pp. 123, 82 illustrations. 5s.

This book completes the *Everyday Life Series* from Palaeolithic to modern times, and the authors are to be congratulated upon the accomplishment of a well-written, well-illustrated and painstaking work. The series is designed primarily for children, and it is to be hoped that before very long it will become part of the normal curriculum of every boy and girl. The style and the numerous illustrations will appeal to the older child, who, if intelligently instructed, is naturally interested in things of the past. With the education of the child in the rudiments of archaeology, we can hope for the disappearance of vandalism which, through ignorance, is too prevalent even to-day. Some of our museum curators are already doing good work in this direction and their labours will undoubtedly bear fruit. But it is not to the child alone that this series will be of service. Time and again we are asked by persons who have become interested in archaeology and who wish to go deeper into the subject, " Which is the best book to begin with ? " In future our answer will be " Quennell's." R. C. C. CLAY.

OUR HIGHLAND FOLKLORE HERITAGE. By A. POLSON, F.S.A. SCOT. Inverness : The Northern Chronicle Office. 1926. 8vo, pp. 167. 5s.

This collection of beliefs and stories gathered from the north of Scotland is very welcome as it puts on record some of the traditional lore of the past which, thanks to the written word, the facility of communication and the increase of knowledge, is rapidly becoming a thing of the past. Folklore is now, and deservedly, coming into its own ; and its co-operation with anthropology and archaeology is as necessary to the progress of science as the team-work of the various persons in an operating theatre is necessary to the success of an operation. It is interesting to notice how widespread are certain beliefs such as the power of amulets and the healing properties of particular springs, and the *corp creadh* is an example of sympathetic magic that can be traced back to the days of the Upper Palaeolithic peoples whose paintings of animals on the walls of caves were thought to bring them luck in the chase. The *teine eigin* or " need fire," kindled as it is by the friction of one stick upon another or the rotation of an upright stick in a prepared socket, must have had its origin in the far distant past, and has its modern counterpart in the bow-drill of the Eskimos and the stick and groove of the Polynesians. Birth, marriage, death, ghosts, fairies, kelpies, hallowe'en and yule-tide are but a few of the subjects that the author treats of ; and the avoidance of over much explanatory matter adds to the pleasure of reading. Mr Polson thoughtfully informs us as to which side of the bed to get out in the mornings, and reassures us that " the Old Celts had quite a variety of tricks by which they could cheat the Devil." R. C. C. CLAY.

RACIAL ORIGINS OF ENGLISH CHARACTER. By R. N. Bradley. London : Allen & Unwin, 1926. pp. 192. 6s.

There is much interest abroad in all that relates to the evolution of men and the interpretation of their diversities in time and space, and the author here presents us with an amusing sketch, full of shrewd hits, which is at any rate on a far better level than the diatribes of H. S. Chamberlain and L. Stoddard. Unfortunately we need to know far more of the associations of physical and psychical features, and to have much careful weighing of the respective powers of environmental-historical influences and racial hereditary traits. Nevertheless the suggestion of the Nordic ruler with his games, his conventional pride, and his half-kindly contempt; of the anabolic Alpine looking upon death as a negligible bridge to higher anabolic successes; of the intellectual Beaker-man compounded of and understanding both Alpine and Nordic; and of the Mediterranean steeped in feeling and passion, all have some justification. The Mediterranean type is perhaps the least adequately treated ; his tendency to reckless multiplication in the slums of cities is rather hastily ascribed to racial tendencies, whereas a case could be made out for looking upon it as the outcome of conditions of life which have not encouraged care for the morrow. Mr Bradley is, no doubt, on right lines in ascribing much that we value in British life to the fact that in our island environment we have found so many opportunities for expression of the characteristics of that multiplicity of types which we owe to our position at the end of zone of contact between racial and cultural movements from the Mediterranean on the one hand, and the European plain on the other. The recognition of the type of the " Beaker-man " is an interesting point in this book. Bradley accepts from Peake and Haddon the name Prospector for the stalwart dark broadhead of many west-coast patches in Europe and the British Isles ; he need have no doubt about the occurrence of the type, but the name is open to question, and his suggestion that it is a variant derived by modification of the Mediterranean is very doubtful. He is even more speculative than usual in an appendix on language, where he develops the theory that something akin to Arabic had influence long ago on place-names in south-west Europe. The distribution of place-names with certain prefixes is even more remarkable than Bradley suggests, but it is doubtful whether in this matter he does more than stimulate criticism. The reviewer realizes with some regret what a different book it would be possible to compile on the bases of consideration of most of Bradley's observation ; but this only indicates that we are trying to find a way into a new field of enquiry, and the brightness of this sketch, as well as its effort to avoid savage prejudice, is certainly commendable. H. J. Fleure.